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SYMPOSIUM ON TUMORS OF CENTRAL NERVOUS SYSTEM*

THE PATHOLOGY OF TUMORS OF THE NERVOUS SYSTEM

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Numerous remarkably consistent statistical studies have borne out the fact that intracranial tumors occur in approximately 1 per cent of all autopsies; higher figures have been reported from hospitals which feature a neurologic service. It is therefore imperative that the clinician should have a working knowledge of the natural history of these neoplasms. Because the clinical course, the operability and the prognosis vary greatly for different types, the diagnosis of "brain tumor" alone is insufficient. It should also include the probable localization of the lesion and the probable variety of the tumor.

Before individual tumor types can be discussed, a classification must be adopted. The following classification, admittedly incomplete, is offered because of its simplicity. It is based on the primary site of the neoplasm and a common example is cited for each tissue involved.

TUMORS OF THE NERVOUS SYSTEM

Primary Site		Example
A.	Brain and Spinal Cord Parenchyma	
	1. Primary	Glioma
	2. Secondary	Metastasis
B.	Sheaths of Nervous System	
	1. Meninges	Meningioma
	2. Cranial nerves	Acoustic neuroma
	3. Spinal nerves	Neurofibromatosis
C.	Sympathetic System	Neuroblastoma
D.	Hypophysis	Adenoma

TUMORS ARISING IN BRAIN AND SPINAL CORD PARENCHYMA (PRIMARY)

The most important and least understood group of tumors involving the nervous system are those which arise primarily in the parenchyma of the brain and spinal cord. By far the greater proportion of these are the gliomas. Of all intracranial tumors, 40-50 per cent are gliomatous in type. With one possible exception, any cell element within the brain or spinal cord may be the origin of neoplastic change; it has not been proved that any tumor arises from the microglia. The terminology of the gliomas most widely accepted is that which is based on neurohistogenesis. In the following table, the individual types of primitive and adult cells which have been described in the nervous parenchyma are listed. The tumor corresponding to the individual cell is also given. In addition to the elements listed below, tumors may also arise from the blood vessels; various congenital neoplasms may also occur in the nervous system.

NEUROHISTOGENETIC ORIGIN OF GLIOMAS

Neurohistogenetic Origin		Corresponding Tumor
A.	Primitive cells	
	1. Medullary epithelium	1. Medulloepithelioma
	2. Medulloblast	2. Medulloblastoma
	3. Spongioblast	3. Polar spongioblastoma
	4. Astroblast	4. Astroblastoma
	5. Oligodendroglioblast	5. Oligodendroglioblastoma
	6. Pinealoblast	6. Pinealoblastoma
B.	Primitive and adult cells	
	7. All types	7. Glioblastoma multiforme

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C. Adult cells		
8. Astrocyte	8.	Astrocytoma
9. Oligodendroglia	9.	Oligodendroglioma
10. Ependyma	10.	Ependymoma
11. Ganglion cells	11.	Ganglioneuroma
12. Pineal cells	12.	Pinealoma
13. Choroid plexus	13.	Papilloma
14. Microglia	14.	

In regard to the etiology of gliomas, essentially the same theories have been advanced to explain their origin as for any of the systemic neoplasms. As far as is known, color, race and sex have little to do with the development of gliomas. That trauma can initiate the growth of a glioma is doubted by most; that it may alter the rate of growth or even cause the appearance of symptoms seems a much more likely possibility. Age is an important factor and will be discussed under individual tumors.

Because of their location in the brain, all varieties of gliomas are capable of causing death, although in approximately one-half, the microscopic appearance is that of a benign tumor. A peculiar characteristic of this tumor group is that they apparently do not metastasize to the systemic organs as long as they arise in the brain and spinal cord. However, closely related tumors which arise in the peripheral nervous system or in the sympathetic system may metastasize rapidly and widely. For example, the neuroblastomas which arise in the sympathetic system are among the most malignant of all tumors; they spread widely and early. The medulloblastoma of the cerebellum, which is considered to be a closely related tumor, has never been shown to metastasize outside of the central nervous system. That intracerebral and intraspinal gliomas do not metastasize to systemic organs has been explained by the lack of lymphatic channels in the brain and spinal cord and by the fact that gliomas show no tendency to invade the lumens of the blood vessels.

Certain of the gliomas are capable of metastasizing within the intracranial and intraspinal cavities. The most common of these are the medulloblastomas, the glioblastoma multiforme type, the ependymomas and the pinealomas. The first two varieties do so by spreading either by way of the perivascular spaces or by direct extension into the subarachnoid space. The latter two types are more apt to grow into the ventricular cavities. Particles of tumor tissue break loose and float in the cerebrospinal fluid, attaching themselves at some distant point, such as the cauda equina. Such metastatic lesions are responsible for those cases which clinically show both an upper and a lower motor neuron syndrome. Certain of the gliomas may be multiple; in order to explain these on a basis other than that of a simultaneous growth of multiple tumors, it has been suggested that these are instances of intracerebral metastases.

Many of the gliomas are quite rare and little will be said of these. The glioblastoma multiforme group and the astrocytomas make up the vast majority; along with the medulloblastomas, they compose over 50 per cent of all gliomas.

The medulloepithelioma is extremely rare, fortunately, because it is the most malignant of the group. The medulloblastoma, however, is quite common, composing from 10 to 20 per cent of all gliomas. It usually occurs in infants and young children. When it does occur in such patients, its location is almost always in the midline of the cerebellum. Should it occur in an adult, it usually is located in the lateral portion of the cerebellum or in the cerebrum. Its clinical course is rapid, death usually occurring in one year or less. This rapid growth is partly due to the fact that the medulloblastoma grows very rapidly and partly due to the location of these tumors. Being in the midline of the cerebellum it is in a position to produce early obstruction of the flow of cerebrospinal fluid with resultant hydrocephalus. As has already been stated, these tumors commonly metastasize within the intracranial and intraspinal cavities. Grossly medulloblastomas appear as solid but soft, reddish grey tumors. They often seem to be encapsulated but, like all other gliomas, are always actively invasive. They are very vascular but hemorrhages and areas of degeneration are rare. They produce symptoms by compression and displacement of the medulla oblongata and

pons, and by the production of a hydrocephalus. In addition, the tumor tissue or the tonsils of the cerebellum may herniate through the foramen magnum.

The characteristic cell of the medulloblastoma is the medulloblast. It is a very small cell with scanty cytoplasm. The nucleus is oval or round in shape and contains a heavy chromatin network. Mitoses are frequent. The tumor is very cellular in character, the cells tending to be arranged around small spaces filled with an amorphous material (pseudo-rosettes). Many thin walled vascular channels are present. The connective tissue stroma is minimal in amount. Because this type cell is a primitive one, these tumors are very sensitive to roentgentherapy, in fact, the most sensitive of any glioma.

The glioblastoma multiforme variety composes approximately one-third of all gliomas. It differs in its characteristics from the medulloblastomas in several ways. It is far more common in adults than in children, most commonly being found in patients in the fifth decade. Its favorable site is the white matter of the hemispheres. The clinical course is rapid, death occurring on the average one year after the onset of symptoms. They are only slightly radiosensitive. Grossly these tumors usually appear as large non-encapsulated neoplasms filling one or more lobes of the hemispheres and often extending into the subarachnoid space overlying it. Metastases may occur to the spinal cord and often similar tumor masses are present in both hemispheres at once. They may extend across from one hemisphere to the other by way of the corpus callosum. These tumors are exceedingly vascular, many of the vessels being thrombosed. The center of these tumors contains many red, yellow, brown, grey and white areas due to hemorrhage and softening of various ages and sizes. It has been customary to credit these hemorrhages and infarctions with the sudden onset and episodic clinical courses characteristic of these tumors. Small cysts are not uncommon. The tumor is usually surrounded by a large zone of severe parenchymal edema and actual softening may occur.

The tumor derives its name from the microscopic appearance, being characterized by cells showing extreme variation in size, shape and staining ability. Nearly every type of glia element may be found in these tumors. Besides these, numerous multinucleated giant cells are characteristic. Mitoses are common. The vascularity is increased and many of the vessels show endothelial proliferation; some are thrombosed. The tumor is quite cellular except in areas where necrosis has occurred; the cells are often arranged around these necrotic areas in a pseudo-pallisade fashion. Evidence of old and recent hemorrhage is common.

The polar spongioblastomas occur infrequently but merit some attention because they usually occur in regions which are inaccessible to operative procedures. They are most commonly found within the brain stem or along the optic tracts. Their age incidence is usually in adolescents and young adults. The clinical course is slow, averaging four years. They are resistant to roentgentherapy. They do not metastasize. Even though located in the brain stem adjacent to the aqueduct of Sylvius, the rate of growth is so slow that hydrocephalus is rare until late in the course of the illness. These tumors may be associated with peripheral neurofibromatosis. Grossly they appear as grey avascular firm tumors; their color makes it difficult often to identify the margin of the tumor. Cyst formation is rare; occasionally calcium deposits may be present. Microscopically the tumor is made up of spongioblasts, bipolar or unipolar elongated cells with oval nuclei containing abundant chromatin. The cells have a tendency to lie parallel to each other. Mitoses are rare.

ADULT TYPE OF CELL

The astroblastomas are tumors which have many of the characteristics of the glioblastoma multiforme and also of the more mature astrocytoma, being considered by many to be a stage between these two tumors; they are quite rare. The astrocy-

tomas occur with approximately the same frequency as do the glioblastoma multiforme variety. They are most commonly seen in cerebral hemispheres of adults. If they do occur in children, they usually do so in the lateral portion of the cerebellum. These tumors grow very slowly, the usual duration of symptoms being six years. They are not radiosensitive. Calcium deposits may show on x-rays of the skull. The cut surface of the astrocytoma is grey in color and smooth; it may be soft or quite firm and rubbery. Its margins blend imperceptibly with the surrounding brain tissue. Very frequently these tumors are cystic. Only a small portion of tumor tissue may surround these cysts. Often a small mural nodule is the only tumor tissue which is present. The cyst is filled with a straw-colored or orange fluid which coagulates on removal. After removal of the fluid by aspiration, the cyst rapidly refills itself. Hemorrhages are rare.

Astrocytomas are divided into two main types, depending on whether the type cell is a fibrous astrocyte (fibrous astrocytoma) or whether it is of the protoplasmic type (protoplasmic astrocytoma). Except for the difference in cell type, these variations present no worthwhile pathologic or clinical differences. The essential difference in these two cell types is that the former has numerous fibers and scanty cytoplasm while the latter has abundant cytoplasm and few fibers. With special stains, it can be seen that these astrocytes characteristically have one process on each cell which attaches to the vessel wall by a sucker-foot. The processes often seem to form a glial wall about the vessels. The vessels themselves are not greatly increased in number nor do they show much alteration in their walls. Areas of necrosis and hemorrhage are rare. Mitoses are infrequent.

Other types of gliomas are not frequent. The oligodendrogliomas are tumors of adult life, usually occurring in the hemispheres. They are benign tumors, growing very slowly (average six years). In these tumors, x-rays of the skull often reveal the presence of calcium deposits. Grossly they appear as firm reddish grey tumors which often seem to have a sharp margin. The type cell is the oligodendroglia cell. These are small cells with scanty cytoplasm and round nuclei showing a heavy chromatin network. They have a few very short fibrous processes; mitoses are rare. Hemorrhage and necrosis are uncommon.

The ependymomas occur along the walls of the ventricles, especially the fourth ventricle. They are slow growths. They cause symptoms mainly by obstructing the flow of cerebrospinal fluid. At times these may act like a ball-valve, causing symptoms referable to an intermittent hydrocephalus. For instance, in the early stages, the patient may have headache only when the erect position is assumed. A further diagnostic point is that ependymomas are practically the only tumors, occurring in the lateral ventricle of children, which show calcium deposits by x-ray. Although these tumors are among the rarer cerebral gliomas, they are the most common glioma found in the spinal cord.

BRAIN AND SPINAL CORD TUMORS (SECONDARY)

Metastasis to the brain from malignancy of distant origins is quite common. Statistical studies have indicated that these make up approximately 20 per cent of intracranial neoplasms which occur in a general hospital. This figure may be even higher because such metastases frequently present no signs or symptoms. In many instances, the patient presents himself with his complaint directed to the cerebral lesion. These observations bring out the fact that all patients diagnosed as having brain tumor deserve a careful systemic examination, including x-rays of the chest. Grant, in reviewing this subject, stated that metastases from carcinoma were much more common than from sarcomas. However, he pointed out also that this was the result of systemic carcinomas being more common than sarcomas and that actually a higher percentage of sarcomas metastasized to the brain. Certain malignancies metastasize frequently to the intracranial cavity when they arise in certain organs but the same type of tumor

when located in other organs may do so rarely. For example, carcinomas arising in the breast and lung have a high percentage of intracranial metastases while metastasis from gastric carcinoma is infrequent. Of the sarcomas, the melanomatous variety furnishes approximately half of the intracranial metastases. These metastases may be located in any portion of the nervous system but usually are found in the cerebral hemispheres. They may be spread diffusely throughout the subarachnoid space ("diffuse leptomeningeal carcinomatosis"). In the brain, they may be represented as one large single tumor mass, as multiple small nodules or as many small microscopic perivascular tumor accumulations. The left side of the cerebrum is said to be involved more frequently than the right; such is explained on the basis that the left hemisphere, being of more physiologic importance, receives a better blood supply. The greater number of vessels offers more opportunity for blood borne tumor emboli to reach the left hemisphere. Once a cerebral metastasis has occurred, death usually occurs within several months. The nervous system may be involved by direct extension of neighboring malignancy. Examples of such are nasopharyngeal carcinomas and neoplasms of the bones and soft parts about the spinal cord.

NERVOUS SYSTEM SHEATH TUMORS

The brain, cranial nerves, spinal nerve roots and peripheral nerves are all surrounded by sheaths and tumors may arise from any of these structures. Sheath tumors make up approximately 15 to 20 per cent of intracranial tumors, a much lower incidence than that of the gliomas. In contrast, sheath tumors compose 75 to 80 per cent of tumors found in the spinal canal and cord; the gliomas here play a relatively smaller role. All of these tumors produce symptoms by compression of the nervous tissue. They may cause alterations in the overlying bone or, if properly located, may cause obstruction of the flow of cerebrospinal fluid.

Of these tumors, the meningiomas are the most frequent type, composing approximately 10 to 15 per cent of intracranial neoplasms. Most commonly, they are seen in patients from 30 to 40 years of age. In location they may be found anywhere within the intracranial or intraspinal cavities. Their sites of predilection are along the superior longitudinal sinus, the undersurfaces of the frontal lobes and along the sphenoid ridges. By far, the majority are located in the anterior half of the brain. It has been assumed that the reason for this localization is that these tumors arise from pacchionian bodies, the distribution of which is comparable to the distribution of meningiomas. These neoplasms ordinarily are very slow growing, some having symptoms for periods of 15 or more years. I have seen one instance in which a meningioma was the only abnormality found in a patient who had had Jacksonian seizures for 25 years; the tumor was in the proper location to explain the seizures. As these tumors grow, they gradually push the brain away; rarely do they actually invade the brain tissue. If the rate of compression is very slow, the brain will tolerate quite a large growth. Except on the rare occasion when they do invade the parenchyma, a thin capsule is located between the tumor and the brain, thus increasing the ease of surgical removal. Hyperostosis may overlie the meningioma and at times the tumor tissue may erode or invade the skull, eventually presenting itself in the subcutaneous tissues of the scalp. On occasion, there are multiple meningiomas. Calcification may occur within them.

Grossly these tumors are usually rounded, often lobulated masses which are grey or reddish grey in color. All are encapsulated. They may be attached to the dura by a broad or pedunculated base. Some are oval in shape, having a disc-like appearance (meningioma en plaque). The vessels in the capsule may be dilated and filled with blood; hemorrhages may be present within the tumor. Their microscopic appearance is exceedingly varied; various extensive and complicated classifications have been based on this. Some resemble closely endotheliomas and have been called such. The classi-

cal meningioma is the psammomatous type. This variety is made up of neoplastic cells which resemble mesodermal elements; it is quite cellular. The vascularity is a prominent feature. The cells have a tendency to be arranged around these vessels in a whorl-like fashion. Irregularly these central vessels often undergo degeneration and calcium is deposited in their stead; this deposit is called a psammoma body. The adjacent brain tissue is compressed and often atrophic; edema may be marked. On removal of the tumor, the brain tissue shows remarkable ability to re-expand and fill the gap.

The second largest group of sheath tumors are those which arise from the sheaths of the cranial and spinal nerve roots of which the acoustic neuroma is a common example. The acoustic neuromas compose approximately 5 per cent of intracranial tumors. These neoplasms usually occur in young adults and arise from the sheaths of the acoustic nerve. They may be bilateral; multiple meningiomas may be associated with acoustic neuromas or the patient may show peripheral neurofibromatosis (von Recklinghausen's disease). They are benign, encapsulated firm tumors. On cut section, they may be smooth or slightly lobulated and are pinkish to yellowish grey in color. The acoustic nerve as well as other adjacent cranial nerves are stretched and flattened by the tumor mass and may be embedded in the capsule, making surgical removal more difficult than is apparent. The brain stem is pushed to the opposite side and the adjacent cerebellum is compressed. Tumor tissue usually is present in the internal acoustic canal; in fact, some insist that the tumor arises from this region. As this portion of the neuroma grows, the internal acoustic pore is dilated (an x-ray finding of diagnostic importance). These neoplasms may be quite vascular, especially on the surface; cysts and areas of degeneration are not unusual. Microscopically, the acoustic neuromas are made up of numerous elongated cells closely resembling fibroblasts. These cells tend to be arranged in parallel rows, often giving a pseudopallisade appearance. No nerve tissue is present in the tumor itself although the fibers from the acoustic nerve may be seen in the capsule.

In many ways similar to these are the neurofibromas which arise in the sheaths of the nerve roots, cranial or spinal, and the peripheral nerves. On rare occasions, these tumors may even occur within the brain or spinal cord parenchyma. They may be solitary tumors or numerous small nodular tumors may be found in many portions of the body. The latter variety is usually termed von Recklinghausen's neurofibromatosis, an hereditary neoplastic disease. The patient's attention ordinarily is called to these small nodules during adolescence or young adult life. They are usually very slowly growing benign tumors; rarely one or more of the nodules may become malignant. In addition to the tumor nodules, pigmented moles, cafe au lait spots, or local "elephantiasis" of the skin may be associated. In the intracranial cavity, tumors of both acoustic nerves are common and multiple meningiomas may be present. In macroscopic and microscopic appearance, they closely resemble the acoustic neuromas but are differentiated from them by the fact that numerous nerve fibers run irregularly through the center of the neurofibroma while these are apparent in the capsule only of the acoustic neuroma.

Tumors of the hypophysis are not true tumors of the nervous system and affect the brain by compression only. The nervous tissue in the eye and in the sympathetic system may be involved by neoplastic disease but will not be discussed because their activity more closely resembles that of any systemic tumor.

SUMMARY

The frequency with which tumors of the nervous system are seen emphasizes the need of the general practitioner to have a working knowledge of their features. To encourage such an understanding, salient points in the pathologic appearance and natural course of the more common examples have been reviewed.

PSYCHIATRIC ASPECTS OF CEREBRAL TUMORS

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The subject of mental symptoms in brain tumor has justifiably provoked increasing interest in recent years. A surprising proportion of brain tumors may be found among people with apparent psychoneurotic complaints. One might generalize to the extent of saying that it is best to assume that any "nervous" complaint may have a clinically important basis, even when psychologic motivation seems certain. This assumption should be maintained until, by repeated neurologic examinations, the possibility of organic brain disease is eliminated. That psychogenic factors may operate, where morbid anatomy seems the sole cause of symptoms, is not denied, and constitutes a possibility which demands equal alertness.

Before the Cushing era, one usually suspected a brain tumor when a patient presented the triad of headache, vomiting, and choked disc — with progression of symptoms. Unfortunately, however, the long heralded triumvirate of headache, vomiting and choked disc, fails us too frequently, for they are not signs of brain tumor *per se*, but evidences of increased intracranial tension, and therefore, except for those small tumors which arise within and block the ventricular system appear late in the course of the disease at a time when the tumor has reached an enormous size. If the tumor is malignant the old triad may appear quickly. If benign, the patient may go about for years with an operable tumor, suffering relatively minor distress of a character which, to many physicians, is not even reminiscent of brain tumor.

Psychiatric manifestations are rather common in brain tumors, regardless of the type and location. Various observers have noted incidence from 40 to 100 per cent. Gibbs, in a study of 1,545 cases, found in 27 of these cases the only mental symptom to be that of irritability; jocularity in 33, and drowsiness in 235. Others report larger incidence. Nasse observed mental symptoms in 19 of 50 cases. Schuster and Moersch found them in 100 per cent. Oppenheim makes the unqualified statement that there can be no gross lesion in the brain without some disturbance, greater or less, in the psychic functions, if the observer has known the patient intimately before his illness. It is apparent that the definition of psychic symptoms is most elastic. Moersch, for example, included such general psychic phenomena as listlessness, indifference, anxiety, mental and physical let-down, dullness, mild apathy, and late stupor. Jameison and Henry emphasize the fact that an organic disease which occurs during the course of a psychosis, interrupts the psychotic state for a greater or lesser length of time. During this period the patient complains and behaves very much as would a normal person developing a similar disease. A change of this sort should therefore arouse the suspicion of an alert observer, and should indicate the necessity for repeated, careful neurologic examinations. These observations confirm those of Knapp, who found that in 79 of 104 brain tumors in insane patients, the changes in symptomatology were sufficient to attract attention. Although the statement is rather generally made that many patients are confined in institutions for the insane, when their primary pathology is really brain tumor, the percentage of such cases is small. For instance, Fisher found one case in 350 autopsies; Jameison and Henry found 26 brain tumors (four of which involved the frontal lobe) in a study of the material collected over a 30 year period, from the State Instiitions of New York. The two conditions in which mental symptoms occur, that must be differentiated in suspecting a brain tumor, are, general paresis, and the psychoses of advanced age.

The causes of the disorders of the personality as a whole, cannot be defined solely by reference to the immediate precipitating event. This event could be a brain tumor, a vascular brain injury, an unfortunate love affair, or some other form of frustration. The factors of intrapsychic conflict war-

rant serious investigation. The mental changes occurring in brain tumors are indistinguishable from those produced by vascular diseases, syphilis, or a psychiatric condition associated with organic brain disease. Whatever the location of the tumor, prolonged intracraniai hypertension and neoplastic destruction of the brain structure always produce some degree of organic dementia. This dementia is usually progressive, but varies considerably with changes in intracranial pressure. Usually regressive changes are most prominent with frontal and corpus callosum tumors.

EMOTIONAL CHANGES

There have been many observations of the emotional changes which accompany brain tumors, and some attempt has been made to correlate these changes with the location of the tumor, while some insist upon the specific nature of these manifestations. The majority of investigators have concluded that these symptoms are uncommon with frontal lobe tumors. Some have stated that the mood is determined in large part by the type of personality.

Wide variations in psychomotor activity are observed according to the location of the tumor, the rapidity of its growth, and the stage of the illness. In the early stages, irritability, restlessness and aggressive tendencies are commonly observed. The patient may have vague feelings of discomfort, or actual pain in his head or in other parts of his body. As intracranial tension increases, restlessness may be succeeded by general overactivity, and together with neoplastic destruction of the brain structures there may be an active delirious state. The patient is then quite excited and sometimes destructive. This excited phase may be of short duration, or may dominate the clinical picture for weeks or months. During the later stages of the illness, excited, overactive periods may alternate with those in which the behavior is slow and hesitating. So many individual variations are observed that it would be impossible to draw any general conclusions unless a large number of cases were studied. In a few cases that have been observed it was found that hysterical or hypochondrical symptoms were among the first indications of a personality change. When a tumor involves the optic thalamus, the unprovoked laughing and weeping, which is beyond control, represents a degree of emotional instability which is almost pathognomonic of disease in this region.

When one takes into consideration the complex problem of hallucinations it is difficult to find any certain correlation between this phenomenon and other manifestations of brain tumor. Hallucinations are associated with such a wide variety of conditions and diseases that it is impossible to determine to what extent they may be psychogenic or toxicogenic even in cases of organic disease of the brain. Crude hallucinatory phenomena seem to be more frequently associated with organic diseases of the central nervous system than with psychogenic disorders. On the other hand, in the so-called functional disorders, the hallucinatory material is more highly organized and expresses the tabooed longings of the individual.

Organic disease of the brain interferes with orientation, through actual destruction of essential structures, pressure from edema, hemorrhage, tumor growth, and through obstruction to the circulation of the cerebrospinal fluid. Adequate contact with reality may also be impossible because of the pathologic stimulation of the nervous structures by disease processes. In some cases hallucinations appear only occasionally, in others, frequently. The greater percentage of hallucinations are visual, and next in frequency are those auditory in character. Hallucinations appear more often in tumors of the temporal lobes, and this is especially true of the visual type. Tumors of the parietal lobes seldom have any hallucinatory manifestations, while those associated with tumors of the posterior cranial fossa are crude and poorly organized. Hallucinations may be present at any time during the course of the illness. Occasionally they are among the first symp-

toms of brain tumor, and they may appear a long time before a correct diagnosis of cerebral neoplasm is made. On the other hand, they may be presented very late in the disease. The quality of the hallucination is somewhat distinctive. A large percentage of the visual hallucinations consist of flashes of light—vividly colored—or objects. Animals of all characters are commonly seen. Auditory hallucinations associated with tumors of the frontal or temporal lobes almost always include voices, singing, bells, and other forms of musical sounds. Olfactory and gustatory hallucinations are associated with tumors of the temporosphenoidal lobe, particularly on the right side.

Delusions are seldom noted in connection with brain tumors. Even with previously psychotic patients, the development of brain tumor tends to minimize the expression of delusional ideas. Whenever delusions are present they are usually persecutory in nature.

Memory disorder in brain tumor is intimately associated with the capacity to maintain contact with reality. It does not occur as long as the sensorium remains intact. Whenever memory is defective, associated with mental confusion, there is evidence that intracranial hypertension exists. No special predilection to memory disorders are noted because of the location of the tumor.

A wide variation in the degree and kind of insight is observed at different stages. As a rule cerebral neoplastic patients, especially in the late stages, have little or no appreciation of their condition.

From many cases gathered, chiefly from literature, and personal experience in my practice, the psychiatrist unquestionably can, and does, contribute a great deal in recognizing early psychic manifestations of brain tumors.

In the early cases of brain tumor the reactions are determined more by the type of personality affected, but as the disease progresses the manifestations are increasingly those of organic disease of the brain. They are sometimes dependent upon the location and rapidity of growth of the tumor, as well as upon the degree of intracranial hypertension. Terminal organic dementia is the result of prolonged and high degrees of intracranial pressure as well as the neoplastic destruction of the cerebral tissue elements. The symptoms frequently identified, by the psychiatrist, of localizing values, are those especially recognized in frontal lobe neoplasms. Frontal lobe tumors predominantly manifest psychic alterations and are closely related to functional psychoses. Temporal lobe tumors exhibit very unpleasant olfactory and gustatory hallucinations. Tumors in this location usually present highly organized visual and auditory hallucinations. Parietal lobe growths present little, if any, psychic symptoms. Occipital lobe growths frequently present visual and auditory hallucinations. Blindness without insight is not uncommon with tumors in this location. Cerebellar tumors present late mental alterations. Corpus callosum tumors present psychic changes similar to those found in frontal lobe pathology. Basal tumors present, outstandingly in their psychiatric manifestations, somnolence, disorientation, and early memory disturbances. Ponto-medullary tumors are commonly associated with crude tactile hallucinations.

CONCLUSION

It is my opinion that cerebral neoplasms are always associated with either minor or major alterations.

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DIAGNOSTIC FACTORS IN CRANIAL TUMOR

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The brain is one of the commonest sites of newgrowth formation in the body. This fact is not as widely known as it should be, and therefore diagnosis of brain tumor is often delayed. What is thought to be rare is not so readily looked for or recognized. I would like to reemphasize briefly some fundamental facts in the evaluation of the symptoms of brain tumor most useful to the general practitioner.

Diagnostic problems that can be understood by simple clinical observation are often too easily evaded and passed on too soon to the pathologist or radiologist for diagnosis without a methodical and confident examination of the problem. There are many reasons for this attitude on the part of the general practitioner. Among them is the fact that the teaching and discussion of neurologic diagnosis has always shown a strong tendency to be cast entirely into an anatomic mold. Written descriptions of nervous diseases are, too frequently, nothing more than dull catalogs of localizing signs and symptom complexes difficult to memorize and easily confused.

Illness, as it exists in neurology, must be evaluated in time as well as in space, and this truth is just as important in the recognition of brain tumor as in any other nervous disorder. Let us review some of the common symptoms attributed to brain tumor which have been universally described. They are headache, papilledema, vomiting, progressive loss of mental alertness, epileptiform seizures, and occasionally a slowing of the pulse. When all of these are present and obvious, diagnosis is not difficult. Most cases that come to a doctor, however, especially in the early stages of an illness, do not show this textbook picture of a well developed disorder. The doctor must decide as to the probability of brain tumor on the basis of more vague complaints, and possibly only one or two of those listed above. The following facts have proved helpful in the evaluation of some of these complaints.

HEADACHE

Headache is commonly regarded as a frequent early symptom of a space-occupying lesion within the cranium. It is very necessary to have some definite idea about the kind of headache one sees in early brain tumor, especially if there are no other abnormal physical findings on examination. When you recall that headache is one of the most frequent complaints of man, it is obvious that this may be a very difficult task. The most common difficulty will be the differentiation of headache due to brain tumor from the headache of the psychoneurotic, the headache of the migrainous patient, and the headache due to gastrointestinal disturbance, fatigue, eye-strain, or other situations. One of the best ways to illustrate the difference between these types of headache is to record the usual verbal description of a headache in the case of a psychoneurotic woman.

"Doctor, just look at me. You can almost see my face drawing. It is all due to this head. I feel like my head is being twisted from my shoulders, being squeezed and put into a vise. I almost die with it. It never lets up. It is with me all of the time. You couldn't hurt me any more if you stood up and hammered nails into my head. It is the most terrific pain that anyone has ever suffered. Oh! How I suffer—terrible! Sometimes I think it isn't really a pain, but more like corkscrews and knives going into my head."

"Where is your pain?"

"It's everywhere, all over my head, doctor. I can't tell you where it is. It's just a headache, but it's awful."

Further questioning leads to more florid statements until it is almost impossible to decide exactly what the patient does feel.

"Nothing has ever helped it," she continues, "it is there all of the time. I have had it for months and years."

During this description the patient is constantly showing extreme animation, us-

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ing her hands, her facial muscles, her body, sometimes standing up the better to point to her head or to make a point, exerting every ounce of energy to provoke an appropriate appreciation in the physician of her intense suffering, of which, despite her appearance, there is very little evidence in the lines about her eyes, her mouth, or in her apparent state of health.

Contrast this with the description of headache extracted with some difficulty from the usual patient with a brain tumor. The patient shows very little animation, and gives one the impression that he does not care whether you get all the facts or not. There is a paucity of movement, and he is extremely economical in his words. He seldom moves except to look at the physician, or to shift his position slightly and carefully on occasion. He clearly appears intensely preoccupied in contrast to the former patient, who, during a florid description of the pains, attempts to arouse a reaction in the physician.

To the question, "You have a headache?", he answers, "Yes, sir."

"Tell me a little about it."

"Well, it's kind of a bad headache."

"Where is it?"

"It's right here," pointing to the frontal region.

"What makes it worse?"

"Only when I bend down. It's sometimes worse in the morning. Oh, yes! Maybe when I go to the toilet."

The difference in the behavior, description, and appearance of both patients is striking and significant. It is the headache of this last patient, poorly and uninterestingly described, that ought to trouble the physician, rather than the previous one so fully and dramatically presented.

The headache of true intracranial pressure increase is often throbbing in character, and is increased by any physical exertion of any kind, such as stooping or straightening up. When the patient awakens in the morning with headache, he frequently attempts to sit up to get relief. The headache frequently develops during the night, and awakens him. It is intermittent and paroxysmal but soon becomes more frequent and more severe as the lesion progresses, and then nausea and vomiting, another of the symptoms of intracranial pressure, appear. As the tension continues to rise, the headache becomes frightful in intensity, the patient often clasping his head with his hands and crying out. Such paroxysms are often of grave import and a bad prognostic sign unless quick and effective measures are taken. Coma may supervene after this stage. Although the progressively downward course, which I have just described, may be compressed within the period of a very few weeks or spread out over many months, the other symptoms are gradually added to the headache.

The diagnosis of migraine may usually be excluded by paying special attention to its diagnostic points: The long history, probably dating from puberty, the occasional familial history, the precedence of the headache by a number of sensory symptoms, either visual or cutaneous, for some ten or twenty minutes, and the characteristic dawning of pain, usually in one temple, gradually extending over the forehead or up to the opposite side. This kind of headache is rapidly followed by the development of nausea and perhaps vomiting. After some hours, or a day, the attack passes off, leaving the patient in his usual health until the next attack.

Tumor and migraine may have the same type of throbbing headache. At its point of maximum severity it may reveal a tender scalp or pain in the eyes may be present. Motion of the eyeballs may produce pain, and a strong light may also be very unpleasant to bear. Again, it is the history which helps to distinguish between tumor and migraine.

The headaches of gastrointestinal disturbances in many otherwise healthy persons, or headache due to fatigue and eyestrain may also be paroxysmal. These lack the dramatic background of psychogenic pain, and do not have the progressive quality of headache due to increased intracranial tension.

Vomiting caused by intracranial tension is spoken of as projectile in type, but this is not usually the case, as it is far more common for the patient to experience nausea with some retching before the vomiting occurs. Physical exertion is prone to precipitate the vomiting, just as it precipitates the headache itself. This is by no means a frequent symptom, but it appears more rapidly when tension rises quickly within the skull.

PAPILLEDEMA

Papilledema is not invariably associated with a space-occupying lesion, for it may be absent throughout the whole course of the illness or may be very late in developing. In other cases, however, it develops very early and very rapidly, and if the pressure is not released quickly, papilledema may proceed to a consecutive atrophy of the optic nerve with permanent loss of vision. An important diagnostic point is that early in the course of papilledema visual acuity is often excellent, and the difference between the appearance of the eye-ground and the vision is striking. It is this fact that serves to differentiate true papilledema from optic neuritis or retrobulbar neuritis in much less severe conditions, since in the latter the loss of vision is greater than the appearance of the disc would lead one to expect.

MENTAL CHANGE

Mental change is a very variable diagnostic factor, much more so than headache or vomiting. In frontal lobe tumor, loss of mental alertness, alteration of disposition, and increasing irritability, may usher in the clinical picture. These are, however, local rather than general symptoms. Sooner or later in all cases of continual increase in intracranial tension, there is gradual blunting of alertness, disturbance of memory, and loss of power of attention or concentration.

SLOWING OF THE PULSE

Slowing of the pulse is not a common symptom or sign in brain tumor. If present, one must suspect head injury, subarachnoid hemorrhage, or abscess, because they are conditions in which there is a rapid rise of intracranial tension which does tend to produce a slow pulse. In patients where the pressure rises gradually, it may reach a very high level without any slowing, but in spite of this the blood pressure does not rise above normal.

EPILEPTIFORM SEIZURES IN BRAIN TUMOR

Epileptiform seizures are important if one remembers that such fits cannot be distinguished in any way from those of idiopathic epilepsy. The fit may occur during the course of an intracranial tumor, and is often the first sign of such a lesion. The fits are symptomatic, and especially should be suspected of being due to a new growth if they make their appearance in an apparently healthy subject of middle age. Generalized fits are more common, although focal or Jacksonian seizures occur also with tumor. They may appear in the absence of a general rise in intracranial pressure, and may precede such changes by long periods. A rarely mentioned physical sign of increased tension is called "Duff's sign." It may even aid in picking out cases of increased pressure while surveying a ward full of patients at a distance. The sign consists of the repetitious rubbing of the tip of the nose at frequent intervals by patients who have increased intracranial pressure. It was named after Miss Duff, a nurse, who first called Dr. Hughlings Jackson's attention to it on the wards of Queens Square of London. She noticed that many patients with brain tumor, or increased intracranial pressure, repeatedly rubbed the nose, as if it was constantly irritated.

Other characteristic localizing signs such as a dreamy state, smacking of the lips, or a bad taste in the mouth, point to involvement of the uncinate and temporal regions. Characteristic visual field disturbances, difficulty in handling or recognizing objects, the aphasias, and all of the other signs of involvement of specialized regions of the

brain are fully and adequately covered in any textbook of neurology.

SUMMARY

I feel that no apology is necessary for the simplicity of the fundamental facts discussed; they can be easily remembered and can be of real value to the general practitioner who is not interested in detailed neurologic discussions.

BRAIN TUMORS

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As one of the speakers in a symposium on tumors of the central nervous system I think it well to point out that the time scheduled for the entire presentation is two hours, there are to be five speakers, and the time allotted to each one is 20 minutes. I cannot hope to discuss my particular assignment, brain tumors, in anything but the most superficial fashion within such a time limit. On the other hand, since this symposium is designed for the information of the general membership of the Society and not for specialists in neurology, details are not really essential.

I have concluded that the most profitable way to employ the time at my disposal is, after a few general remarks, to present the case histories and demonstrate the patients who illustrate certain important types of brain tumors. My purpose, I think, will be obvious: By the presentation of these patients I hope to be able to dispel to some small extent, at least, the general gloom associated with brain tumors in the minds of the profession as well as of the laity.

At the best, of course, the outlook cannot be described as bright, and it is altogether hopeless in the absence of prompt and energetic treatment. Although categorical and unqualified statements are always dangerous, I nonetheless shall make one. I desire to say deliberately that the treatment of all brain tumors is surgical. No other form of therapy produces results. But before surgery can be instituted, diagnosis must be made and that is no simple matter. We have come a long way since that day in 1884 when Godlee removed a brain tumor which had been diagnosed and localized by Bennett by clinical methods, but at that we still cannot make a positive diagnosis of the type of tumor present in any given case except by the aid of the microscope. It is true that we can predict the type likely to be present on the basis of the age of the patient, the physical findings, and the behavior of the tumor (that is, the clinical course), but until other methods are devised it is still necessary to make the diagnosis by surgical exploration, even if the procedure amounts to no more than punch biopsy.

The diagnosis of brain tumors is the responsibility of another speaker but I may say briefly that a cerebral neoplasm should be suspected in any case in which there has been progressive loss of some function of the nervous system which cannot otherwise be explained.

MALIGNANT TUMORS

Tumors of the brain, like tumors of any other tissue, are classified first of all as malignant or non-malignant. Unfortunately, a large proportion, approximately 45 per cent, fall into two highly malignant classes, the glioblastoma (spongioblastoma) multiforme and the medulloblastoma. Another 37 per cent are astrocytomas, which are of a relatively mild degree of malignancy. More than 80 per cent of the gliomas thus fall into three categories and the outlook in the majority of such tumors is hopeless from the standpoint of ultimate cure. On the other hand, even the most malignant types of glioma are frequently greatly benefited by decompression supplemented by deep ray therapy and this plan would probably be the procedure of choice even if the exact type of tumor could be verified before direct surgical attack upon it were undertaken. The prognosis in any variety is naturally dependent upon the cytology but relief of symptoms as well as cure is dependent upon treatment.

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The type of malignant tumor usually seen in childhood is the medulloblastoma. It occurs in the midline of the posterior fossa and causes early and intracranial pressure. Little or nothing is accomplished by the removal of such tumors, even when it can be accomplished, and the surgeon does well if he is satisfied by decompression and deep ray therapy. Formerly the life expectancy in such cases was a little over a year. Recently, by the use of massive x-ray therapy, a number of patients are known to have survived, in comfort, for several years. Since this type of glioma metastasizes, the whole cerebrospinal axis must be treated.

The following case report illustrates what can be accomplished by therapeutic measures in medulloblastoma:

CASE No. 1

J. A., an 8-year-old white girl, was first seen December 4, 1939. Her illness had begun eight months before, with nausea and vomiting, which occurred early in the morning and almost every day. The tonsils and adenoids had been removed, with no improvement of symptoms. One month before she came under my observation, difficulties of locomotion developed. She fell frequently, once from a wagon and once from the porch. She deteriorated in other ways. Her vision failed so that she was no longer able to read, nor could she see well enough to feed herself. Her memory became impaired. She no longer asked to go to the toilet. When she tried to walk she would lean forward, then would begin to run, and finally would dash into some person or object, to prevent herself from falling on her face.

The child had had pertussis and pneumonia at one year of age. Otherwise she had never been ill. The family history revealed nothing significant.

Examination showed a well developed and well nourished girl lying quietly in bed and giving no evidence of pain or discomfort. The pupils were widely dilated and there was practically no response to light. Both discs were highly choked. No vision could be demonstrated on the right side. On the left the child could count fingers at a distance of four inches. She answered questions, although very slowly. She could not walk or stand alone. She could perform the heel-to-knee test, but the finger-to-nose test was fairly well done.

Roentgenograms of the skull showed convolutional atrophy and separation of the sutures. Spinal puncture was omitted. Other laboratory tests revealed nothing abnormal.

The preoperative diagnosis was midline tumor of the posterior fossa, probably medulloblastoma. At operation, which was performed December 15, 1939, a large purplish vascular tumor was exposed in the roof of the fourth ventricle. Since the tumor was well exposed, it was removed in toto, so far as could be judged grossly, even though a rush pathologic report on a biopsied specimen was medulloblastoma.

The postoperative course was stormy for several days, but by the eleventh day the wound was well healed and the child was discharged in good condition January 1, 1940. Since that time she has received intensive deep ray therapy to the entire cerebrospinal axis.

At the present time, almost two years after operation, she is in very good condition and exhibits no residuals except for impairment of vision. She has only light perception on the right side, as the result of optic atrophy, but she can read fine print with her left eye.

The common malignant tumor of middle life is the glioblastoma, which accounts for about 30 per cent of all gliomas. It usually occurs in the cerebral hemispheres. It causes great disability. It grows rapidly and may reach very large size, often involving more than one cerebral lobe and sometimes extending across the midline.

Some authorities advocate that as much of the tumor as possible be removed surgically, after which the dura be closed tightly, so that, when recurrence takes place, no space will be available for decompression and there will be prompt and merciful release by death. This type of tumor is largely responsible for the fatalistic outlook so many members of the profession, to say nothing of the laity, hold about newgrowths of the brain, and I must grant that the point of view is justified. Patients with glioblastoma die so rapidly that I cannot demonstrate any living subject for you tonight.

Other gliomas present a much more hopeful picture. They are of lower grades of malignancy, complete removal is often possible, recurrence often does not take place, and cases are on record in which survival has lasted for 20 years or more after operation.

Although gliomas do not metastasize outside the central nervous system, the brain enjoys no immunity to metastases from tumors in other parts of the body and metastatic brain tumors are common. Lesions in and about the thoracic cage are particularly likely to exhibit cerebral metastases. Sec-

ondary brain tumors usually occur in patients whose outlook for ultimate recovery is hopeless and attempts at surgical extirpation are unjustified. These unfortunate persons, however, can frequently be relieved of the most distressing symptoms referable to cerebral metastases by appropriate surgical decompression, sometimes supplemented by deep ray therapy.

Cases are on record in which tumors of the third ventricle and of the pineal body have been successfully removed. The brain stem itself is still inaccessible surgically and tumors of this region, especially of the pons, which usually are gliomas, are practically inoperable. Relief, however, is possible, as the following case report shows:

CASE No. 2

D. W., an 11-year-old white boy, was first seen September 15, 1941. For the past three months he had had frontal headaches of steadily increasing severity and for one month he had suffered from nausea and vomiting, which often occurred abruptly, and from diplopia. Recently he had been closing one eye, to suppress the extra image. He had ceased to play with other children and had become dull and apathetic. He slept through the night and often spent most of the day sleeping. He had developed difficulty in walking and general weakness, more pronounced on the left side. Neither the personal nor the family history contained anything of note.

Examination showed a well developed and well nourished white boy lying quietly in bed and in no apparent pain. The right pupil was larger than the left. Both reacted to light and in convergence. Both discs were choked. There was a crossed diplopia in looking to the left. Babinski's sign was present bilaterally. The child answered questions rapidly but spoke in a low monotone. During the examination he complained of headache and vertigo and at intervals he put his hand first over one eye and then over the other.

Roentgenograms of the skull revealed nothing abnormal. Examination of the spinal fluid also revealed nothing abnormal except a pressure of 600 mm. of water.

The left-sided weakness, together with the involvement of the right third nerve, suggested the presence of a lesion in the right peduncular region, which did not promise much from operation. The increase in intracranial pressure, however, demanded some sort of relief and suboccipital decompression and exploration were decided upon.

The operation was performed September 25, 1941. The dura was drum-tight but was relaxed after tapping of the left lateral ventricle. Nothing abnormal was found in the vermis, and no evidence of tumor or cyst could be found in either lobe. Wide left-sided decompression was carried out. A few days later a ventriculogram revealed marked dilatation of the two lateral ventricles as well as the third, with no displacement, the findings indicating the presence of a tumor below the level of the third ventricle.

Recovery was without incident. Deep ray therapy was instituted a few days after operation and the patient was discharged in good condition October 8, 1941.

At the present time the child is still perfectly comfortable in all respects. The headache, vomiting, and diplopia have disappeared, he is steady on his feet, and the fundi are normal.

NON-MALIGNANT TUMORS

Non-malignant brain tumors chiefly originate in connective tissue. Since they press upon and into the brain substance and do not actually invade it, theoretically they offer ideal opportunities for removal. Practically the situation is not always so hopeful, because many such tumors spring from the immediate vicinity of large venous sinuses or arise from the base of the brain. As a result, exposure is often extremely difficult and removal is attended with technical difficulties which may be unsurmountable.

Although hemangioma is not a tumor confined exclusively to tissues of the brain, as are the other tumors which have been discussed, a small number of such neoplasms arise from the vascular structures of the brain. Sometimes they can be demonstrated by arteriography but more often exploration is undertaken in the belief that they are gliomas. The outlook is generally favorable. Some hemangiomas can be removed in toto, some can be controlled by ligation or coagulation, and others respond to deep ray therapy. The following case report illustrates the results of treatment in this type of tumor.

CASE No. 3

L. L., a 44 year old white woman, was first seen October 2, 1941. For the past year she had noted progressive weakness of the right hand. She first observed that she could not hold the little finger rigid when she tried to file the nail. Then all the fingers became weak and she dropped whatever she tried to hold. The movements of the hand became uncertain. If she tried to massage her face she found that she was hitting it with jerky, uncertain movements. She lost the power to write.

Soon she found that she could not abduct or adduct the fingers or thumb and the hand felt full and tight. Other symptoms were absent until a few days before the patient came under observation. Then she had some slight blurring of vision and developed a rapidly increasing difficulty in saying what she wanted to say. She had never suffered from headaches or from vomiting.

Examination showed a well developed and well nourished white woman lying quietly in bed and in no apparent pain. Her general physical condition was excellent. Neurologic examination showed weakness of the right side, abnormally active tendon reflexes, and definite reduction in both deep and superficial anesthesia. The finger-to-nose test revealed incoordination. Babinski's sign was present but was not constant. There was slight haziness of the margin of the right disc but no measurable elevation.

Roentgenograms of the head revealed nothing abnormal and the spinal fluid was also normal in all respects, including the pressure (140 mm. of water). Although the findings pointed to a tumor in the left hemisphere, encephalography was considered desirable for sharper localization. The results of the examination, however, were indefinite, and exploration was decided upon.

When a large flap had been turned down on the left side, the dura was found to be tight, the convolutions wide and the sulci ironed out, but no definite tumor was encountered, either superficially or by exploration with the Cushing needle. Tissue taken for biopsy was not absolutely diagnostic but was very suggestive of hemangioma.

The patient made an uneventful recovery and was discharged on the eighth postoperative day. Some time later she was given a single course of deep ray therapy. At this time she is in excellent condition. She has returned to work, has normal use of the affected hand and arm, and notices only occasional speech difficulties and then only for a word or two.

NEUROMAS

Acoustic neuromas are probably the most readily diagnosed of all intracranial tumors because of the characteristic history and physical findings. If they are attacked before the brain stem has become distorted a favorable result can be expected. Usually there is no great difficulty in the diagnosis of pituitary tumors and the results of early surgery are often favorable. In most instances loss of vision is arrested and sometimes the field of vision will widen considerably after the tumor has been removed. Meningiomas are also amenable to surgery, as the following case report demonstrates.

CASE No. 4

N. B., a 52 year old white woman, was first seen September 29, 1941. She had been in excellent health until a few days before, when she had had a convulsion early in the morning, followed by a dull frontal and bitemporal headache. In the afternoon of the same day she had a sudden attack of unconsciousness and fell from her chair. An ambulance was immediately summoned, and on the way to the hospital the patient again lost consciousness and had a second convulsion.

Physical and neurologic examinations were essentially negative objectively except for the presence of a large protuberance on the right forehead just below the hair line. The tumor was about three inches in diameter and was elevated nearly an inch in the center. The circumference was bony hard, the center soft. Pulsation was not present. The roentgenologist's report follows:

"Examination of the skull by means of stereoscopic postero-anterior and right lateral projections, as well as a film designed to silhouette a soft tissue swelling on the right side of the forehead, reveals an irregular rarefaction of the upper portion of the vertical plate of the right frontal bone. The affected area measures 6 x 4 centimeters in its greatest dimensions. The erosion is not uniform and there is complete perforation of both tables only in a small area in the supero-medial angle of the lesion. This underlies the superficial soft tissue swelling and it is noted that radiating spicules of bone extend beyond the outer table of the skull into the base of the rounded mass on the forehead. There is a localized hyperostosis of moderate degree in the horizontal plate of the frontal and anterior portion of the parietal bone. There is a considerably increased vascularity of the right frontal bone, many small channels leading directly into the rarefied area. The diploetic vascular channels are otherwise not unusually prominent and are symmetrically distributed. The cranial vault, except for the changes described, is normal. The sella is of average size and contour and the clinoids are intact. The findings as a whole are strongly suggestive of a meningioma underlying the vertical plate of the right frontal bone and possibly also extending as a plaque under the hyperostotic area. Faint calcium depositions which are apparently within the skull underlying the lesion in the frontal bone probably represent psammoma bodies in the tumor. The relatively small size of the superficial tumor as compared with the area of the skull which is affected rules out the possibility that it is the original lesion. However, the remote possibility of a metastatic malignancy of low grade cannot be excluded."

A diagnosis of meningioma was made and operation was decided upon. The tumor, the involved dura and the bone were removed en masse. The tumor, which proved to be a dural endothelioma, was dumbbell-shaped, the extracranial and intracranial portions being nearly the same size.

Recovery was uneventful and the patient was discharged from the hospital on the eleventh postoperative day (October 5, 1941). At the present time she is perfectly well and has resumed her previous social and religious activities.

SUMMARY AND CONCLUSIONS

It is a truism to say that little by little surgery has broken down its previous frontiers and has advanced into regions previously thought inaccessible, yet the statement is entirely justified in respect to brain tumors. Advances in neurosurgery, including better diagnostic methods, more exact localizing methods, and improvements in technic have brought the surgery of brain tumors to a point at which it can challenge comparison, both as to operative mortality and postoperative results, with many other types of surgery.

Tumors of the brain will always constitute a serious menace to life, and the ultimate outlook in certain classifications is hopeless from the standpoint of cure. A patient with any type of growth, however, should be given the chance which surgical exploration offers, since even if radical removal is not possible, decompression frequently relieves symptoms and supplemental deep ray therapy may make possible longer or shorter periods of comfort. Exploration is the more justified because a patient with a brain tumor has everything to gain from it and nothing at all to lose.

The four case reports presented in this paper are illustrations of what can be accomplished by the measures just outlined.

LAMINECTOMY FOR SPINAL CORD TUMOR AND OTHER DISEASES

ANALYSIS OF 151 CONSECUTIVE CASES

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The term cord tumor is used clinically in an inaccurate sense to describe any space-taking lesion which compresses the cord or its nerve roots. Many such lesions eventually prove to be non-neoplastic and should no longer be considered as tumors. Ruptured intervertebral disc, Pott's disease, epidural abscess and cystic arachnoiditis are examples of these. Thus, a more acceptable definition of a spinal cord tumor is any neoplasm which compresses the cord or its nerve roots.

Tumors of the spinal cord have been classified in several ways. Clinically, they may be divided into: (1) intramedullary tumors such as gliomas and syringomyelia; (2) extramedullary-intradural tumors such as meningiomas and blood vessel tumors, and (3) extradural tumors such as primary and metastatic growths of the vertebral column and the epidural space.

It is my intention in this symposium to present the problem of spinal cord tumor in its true perspective. Since most writers on the subject have confined their remarks to histologically verified cases, data concerning erroneous clinical diagnoses and negative surgical explorations are apt to be omitted.

This study is based on 151 consecutive primary laminectomies performed on as many patients for various diseases among which were spinal cord tumors. All operations were performed by me between 1938 and 1942. Sixty-seven of these were done at Charity Hospital in New Orleans and constitute all of the patients treated by laminectomy on the Tulane Surgical Service. The remaining 84 cases were distributed among nine private hospitals. The number of laminectomies and the condition for which the operation was performed are shown in table 1.

TABLE 1

Laminectomy	Indication
101	Sciatica (due to ruptured intervertebral disc)
10	Chordotomy
5	Epidural spinal abscess
5	Arnold-Chiari malformation
3	Removal of bullet
2	Torticollis
2	Fracture-dislocation
1	Abscess of cauda equina
22	Spinal cord tumor
151	Total

That spinal cord tumor is relatively rare is suggested by the fact that in this series of cases only one laminectomy in seven was performed for this condition. It has been fairly well established by various writers

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that histologically verified cord tumor is one-tenth as common as verified brain tumor. During the period that this series of cases covers, 91 cases of brain tumor were treated. This means that there was one tumor of the spinal cord for every four brain tumors. The discrepancy between these figures is due to the fact that all of my cases of spinal cord tumor have been included without regard to histologic verification.

During this four year period laminectomy was performed 22 times on patients with a clinical diagnosis of cord tumor. In all cases except two there was a complete or partial subarachnoid block upon compression of the jugular veins. Also, all patients had incomplete motor and sensory paralysis of the lower extremities, and in seven instances, of the upper extremities as well. Among the lesions encountered were six gliomas. The spectacular improvement and the persistent good health of the patient in one of these cases suggests that multiple sclerosis or some disease other than glioma was the true condition. A syringomyelic cyst, which caused a spinal block and paraplegia, was the only other tumor in the intramedullary group. In the extramedullary-intradural group were a neurofibroma at the cervical level, a hemangioendothelioma of the cauda equina, a gumma of the thoracic dura, an aneurysm (previously reported) and a case of neuritis of the cauda equina. Obviously, the latter case represents a mistake in diagnosis. In the extradural group there was a case of Hodgkin's disease of the epidural space. There were three primary tumors of the vertebrae including a chondroma, a solitary myeloma, and an unclassified bony stenosis of the entire thoracic spinal canal. There were five metastatic tumors of the vertebral column which invaded the epidural space and compressed the spinal cord. The remaining case was technically not a tumor but a ruptured cervical disc which produced quadriplegia. This is included here because the clinical diagnosis was tumor of the spinal cord.

The mortality rate of laminectomy for tumor of the spinal cord can best be determined by considering the mortality for laminectomy in general. Of the 129 cases of laminectomy for conditions other than cord tumor, there were nine deaths (7 per cent). Three of the 10 patients who had chordotomy for painful and incurable carcinomas died in the hospital. One patient with epidural spinal abscess (previously reported)[2] died on the seventy-sixth postoperative day following the development of empyema. The other four patients are known to be alive and walking. The patient with abscess of the cauda equina died of meningitis. One of the two patients with fractured spine died a few days after operation. Three of the five infants with Arnold-Chiari malformation died.

This low mortality rate is obviously due to the fact that there were no deaths among the 101 laminectomies or partial laminectomies for chronic sciatica due to ruptured intervertebral disc. If these cases and the five of Arnold-Chiari malformation in hydrocephalic infants (combined laminectomy and craniectomy) are excluded, we have a clear conception of the true risk of laminectomy for conditions other than tumor. The operative mortality in this instance becomes about 27 per cent (table 2).

TABLE 2

Cases	Indications	Deaths
10	Chordotomy	3
5	Epidural spinal abscess	1
3	Bullet in spinal canal	0
2	Torticollis	0
2	Fracture-dislocation	1
1	Abscess of cauda equina	1
23	Total	6 (26.9%)

The mortality is definitely less than this in cases of spinal cord tumor. Of the 22 consecutive cases of cord tumor reported here, 20 patients left the hospital alive, a mortality rate of 9.1 per cent. One of the two patients who died in the hospital had paraplegia due to metastatic carcinoma of the sixth thoracic vertebra. After operation he recovered sufficient use of his legs to walk about the hospital with an attendant. He remained in the hospital of his own choice and died on the eighty-first postoperative day of primary carcinoma of the bronchus. The patient with myeloma died of generalized metastasis on the twenty-

seventh postoperative day after having sufficiently recovered to be up in a wheel chair. Thus, it can be seen there was no death immediately following operation or attributable to the operation.

What is the fate of patients operated upon for cord tumor who do leave the hospital alive? Obviously, the answer depends upon the degree of cord damage existing before operation and upon the nature of the lesion if the tumor was not entirely removed. Eight of the 20 patients who left the hospital are known to be walking without crutches. Four others are alive but partially or completely confined to wheel chairs. One died two years later of a primary malignancy after recovering sufficiently to walk without assistance. The patient with myeloma died eight months later. Of the remaining six cases little is known except that these patients were discharged from the hospital in varying states of paraplegia.

The 22 cases, diagnosed clinically as spinal cord tumor, were not the only ones coming to my attention during this four year period. Approximately eight other patients with cord tumor in whom a spinal block could be demonstrated were advised not to have operation because of long standing complete motor and sensory paralysis of the lower extremities. In several of these cases the diagnosis had been made earlier but operation was refused by the patient.

SUMMARY

The outstanding fact in connection with the entire subject of cord tumor is that the diagnosis is not made early enough in the majority of cases. It cannot be too strongly emphasized that when a patient begins to have urinary retention with weakness or numbness of the legs, the attending physician should obtain a surgical consultation as quickly as possible, for spinal cord tumor, in contrast with intracranial tumor, can be and frequently is a surgical emergency.

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PELVIC THROMBOPHLEBITIS* A STUDY OF THE ETIOLOGIC FACTORS FROM A STATISTICAL STANDPOINT

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A review of the recent literature reveals surprisingly few articles dealing with pelvic thrombophlebitis, a condition which is far more common than is generally recognized, and which deserves more study, if its alarmingly high mortality and morbidity are to be reduced. With this idea in mind, it was decided to review all of the cases which had occurred at the Charity Hospital at New Orleans, during the past five years.

Study of the charts of the non-fatal cases, made it soon apparent that the clinical diagnosis, in the majority of instances was unjustified, and probably inaccurate. Considering the history, findings, and subsequent course, it must be regarded that the larger number of these cases were simply femoral, or saphenous thrombophlebitis It was then decided to review only the charts of those cases in which a clinical diagnosis had been confirmed at operation, or in which the condition had been proved at autopsy.

The total number of cases studied, according to these criteria, is 41. With seven exceptions, all of these patients died, and at autopsy pelvic thrombophlebitis was discovered. These seven cases were diagnosed correctly clinically, the findings were confirmed at operation, and recovery followed. Four additional patients were operated

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upon, but died, and the diagnosis was substantiated at autopsy.

The total number of cases, 41, in no way represents the true incidence of the disease, as we have no way of determining how many patients recover spontaneously, or under conservative management, the diagnosis never being established. Even more important, we have no way of determining how many patients die of the condition, unless an autopsy is performed in every instance. In reviewing the records of all patients who died on the obstetric and gynecologic services during this period, we discovered an equal number of cases, which presented identical histories, physical findings, and clinical course, but unfortunately, an autopsy was lacking, to confirm the diagnosis. Those cases are not included in this series.

Most of the patients died on the obstetric and gynecologic services, but some few experienced their demise on the medical, surgical, or genito-urinary services, for want of an accurate diagnosis or other reasons (table 1).

TABLE 1

	Cases	Average age in years
Total series	41	32.1
Postoperative	10	45.3
Puerperal	26	27.1
Youngest patient		16
Oldest patient		76
	15 (36.5%)	25 or under

AGE INCIDENCE

The literature on thrombophlebitis, in general, places the patients in an older age group, but this concerns mainly postoperative thrombophlebitis. For instance, at the Mayo Clinic,[1] it was found that the average age of the patient developing thrombophlebitis was ten years higher than the average age of their operative cases. Here, we must remember, postoperative cases comprise only one-fourth of the series. The larger number of cases followed complications of pregnancy, automatically placing them in a younger age group. In our series, the average age is 32.1 years. Considered alone the postoperative patients averaged 45.3 years. The two extremes, 16 and 76 years, indicate that no age group is exempt, except, perhaps childhood (table 2).

TABLE 2

RACE

	Cases	Per cent
Colored	25	61
White	16	39

There seems to be some slight increased incidence in the colored race. This may be apparent or real. The ratio of colored deaths to white deaths at Charity Hospital, in 1941, was 55:45. There are many possible explanations for the higher incidence in the colored race; for example, fibroids and salpingitis, but the difference is too small to warrant investigation (table 3).

TABLE 3

DISTRIBUTION OF CASES BY YEARS

	Cases		
			L-1
1937	1		T-0
			I-0
			L-6
1938	7		T-1
			I-0
			L-3
1939	7		T-3
			I-1
			L-2
1940	8		T-6
			I-0
			L-1
1941	11		T-7
			I-4
			L-0
1942	7	(4 mos.)	T-7
			I-0

Note: The three hospital services are indicated by the three symbols, L, T, and I. Admissions to these services are based on a 2:2:1 ratio.

We see, by the above table, that the incidence has increased yearly. We interpret this as reflecting a higher incidence of complete autopsies. In reviewing the records and protocols, one is impressed by the improvement in both, during the past few years. In no instance was pelvic thrombophlebitis diagnosed by a sketchy autopsy. The more detailed the examination the higher the incidence becomes. Many cases were lost, because the discovery of any peritoneal fluid, at all, at autopsy, led to a diagnosis

of peritonitis and the pelvic veins were left unexamined.

The month of July, 1937, was chosen for the beginning of this study, because it marked the adoption of the improved record system at Charity Hospital. Only one case is recorded for the last six months of that year, but it so happens that this particular case demonstrates, better perhaps than any other single case, the extensive and remote pathology in a case of postoperative thrombophlebitis. This patient died of cerebral infarction.

The distribution of cases among the different hospital services is not significant; it reflects more the frequency of autopsy, among the deaths on the three services. The increased incidence on one service is partially explained by the fact that seven of the cases were diagnosed at operation alone. Had these particular patients not been operated on, they would not have found their way into this series, unless they had not only died, but also been subjected to postmortem examination.

PARITY

We attach no significance to parity, (table 4) except in its relation to complicated delivery. Naturally the postoperative cases, representing an older age group, had a higher parity, but it is difficult to assign any importance to previous deliveries in these cases except when delivery or abortion occurred immediately prior to the operation. Rather, there seems to be more significance to gynecologic surgery prior to the delivery. The one case of a nulligravida is described in detail later.

TABLE 4
PARITY

Average for series	G4 P3
Nulligravida	1 case
Primipara	7 cases
Multiparae	33 cases

ETIOLOGY

When the cases are classified as to etiology, the picture becomes distorted (table 5). We purposely did not transpose the number of cases into percentage figures, because the resultant figures would give a false impression of importance to the different groups. Unquestionably, the number of postabortal cases should be double the figure given in the table. Analysis of the case records proves this to the investigator, except for one unfortunate feature—autopsy is lacking. It should be stressed here, that all criminal abortions are legally "coroner cases", so that autopsy study is not available. In some few instances, either through error in the clinical diagnosis, or through consent of the coroner, an autopsy was performed at the hospital. These cases showed an exceedingly high incidence of pelvic thrombophlebitis, in its severest form.

TABLE 5
ETIOLOGY

	Cases
Postpartum	17
Postabortal	9
Postoperative	10
Postirradiation	1
Ovarian tumor	1
Fibroid tumor (alone)	1
Cervical stenosis and P. I. D.	1
Unexplained	1

Again, the figure for postirradiation thrombophlebitis would be increased, if all cases could be included. The immediate temperature rise, after the insertion of radium, is frequently due to endometritis, with secondary pelvic thrombophlebitis, very similar to the postabortal type.

The class of pelvic tumors, is, perhaps, more related to phlebothrombosis rather than thrombophlebitis. Regardless, there is sufficient evidence to indicate that some of the fatal emboli that occur in these cases, either on the operating table, or postoperatively, could be prevented by prophylactic venous ligation, prior to the removal of the tumor, especially when there is a swollen leg. The two patients with pelvic tumor in this series died before any operative procedure was done; both suffered massive pulmonary embolism. We have not included in this series the much too common cases of massive pulmonary embolism occurring postoperatively, where the source of the embolus lies in the thigh, calf, or foot. We have included only three cases of massive pulmonary embolism, and in all

three of these, the source of the embolus was in the pelvic veins.

The one unexplained case is intensely interesting, and in no way can we account for its occurrence. The patient was a single, nulliparous, 18 year old colored girl, who gave the following history. There was no menstrual irregularity. There was sudden pain in the back, feeling of coldness, nausea, vomiting, pain in the right, then the left chest, followed by dyspnea and cough. The patient's mother had noticed some swelling of the left leg ten days previous. The patient ran a mild septic course, while in the hospital, then suddenly died. Autopsy revealed thrombosis of the right uterine, left and right hypogastric veins, bilateral pulmonary infarcts, and massive pulmonary embolism. There was no other pathology.

ANALYSIS OF POSTPARTUM CASES

We see that in only two instances of hospital delivery, was there lack of interference of one sort or another (table 6). In one of these two, a previous amputation of the cervix complicates the picture. Four home deliveries are listed as being normal. However, in one instance, the placenta was retained, and was not removed for nine days. This patient died of purulent thrombophlebitis of the uterine veins.

TABLE 6
ANALYSIS OF POSTPARTUM CASES

		Voorhees bag	1
		Forceps—episiotomy (One had prev. myomectomy)	5
1. Hospital	10	Normal (One had prev. amputation of cervix)	2
		Cesarean section (Both classical type)	2
2. Home	6	Normal	4
		Forceps	2
3. Other institutions	1	Normal	1

We feel that retained placenta, or placental fragments, is extremely important in the development of puerperal pelvic thrombophlebitis. A large number of the cases describe excessive hemorrhage at the time of delivery, and passage of clots in the puerperium. The one case, delivered in another institution, had suffered a perineal laceration at the time of delivery, and this had been repaired. The patient died of extensive pelvic thrombophlebitis, involving the ovarian veins, and extending into the renal vein on the left, and the inferior vena cava on the right. The guilty organism in this case was the *Streptococcus fecalis*.

ANALYSIS OF POSTABORTAL CASES

The high incidence of spontaneous abortion in this group is impressive (table 7). Of course, this is open to speculation, but the evidence in these cases pointed to lack of instrumentation. In reviewing the hospital records, it was surprising to observe the number of women who aborted spontaneously on the wards, and subsequently developed a septic course. Needless to say, could all cases of criminal abortions be included, that actually died of pelvic thrombophlebitis, the ratio of criminal to spontaneous abortions would be quite different.

TABLE 7
ANALYSIS OF POSTABORTAL CASES

Spontaneous (One had fibroid)	5
Questionable	1
Criminal	3

It is difficult to evaluate the significance of the fibroid in one case of spontaneous abortion. We believe that this complicating factor merits some attention, if for no other reason than its part in producing the abortion.

ANALYSIS OF POSTOPERATIVE CASES

Hysterectomy is undoubtedly the operation most frequently followed by pelvic thrombophlebitis (table 8). Studies of postoperative embolism of the massive type, have shown that hysterectomy, especially when performed for fibroids, is the most frequent precursor of that complication.[2] We are dealing here with a different type of pathology, but the same principles seem to apply. Tissue destruction, traumatized vascular endothelium, circulatory stagnation, and sepsis are the most significant considerations. Sepsis was the most prominent feature in all but three cases. These three died of massive pulmonary embolus, resulting from pelvic vein thrombosis. The autopsy protocols in these three cases would

suggest phlebothrombosis, rather than thrombophlebitis, as the responsible pathology in the development of the embolus. This makes no difference, as either condition may be followed by fatal pulmonary embolism.

TABLE 8
ANALYSIS OF POSTOPERATIVE CASES

Hysterectomy		6
Vaginal	3	
Supravaginal	3	
D and C, conization, hemorrhoidectomy		1
Trachelorrhaphy and suspension		1
Myomectomy and enucleation of cyst		1
Ileostomy		1
Total		10

One might wonder about the relationship between an ileostomy, and the development of pelvic thrombophlebitis. This particular case had a residual pelvic infection, resulting from a previous hysterectomy, and the ileostomy was performed to relieve a late postoperative obstruction. The immediate factor in the production of the thrombophlebitis, was of course, the ileostomy, but remotely, the hysterectomy was responsible.

CULTURES

Perhaps this section would best be omitted entirely, because of the paucity of cultures (table 9). However, since the title of the paper mentions the etiology of the disease, there must be some interpretation of the available material. It must be realized, obviously, that one or two negative blood cultures bear no significance, and that one cannot hope to attain any number of positive cultures, unless many are taken at the proper time. In this series, the relatively high incidence of *Staphylococcus aureus* septicemia, among so few positive blood cultures, is impressive. These cases were all found in the postabortal group. Not enough cultures were taken to be of statistical significance, but it does seem strange that the hemolytic streptococcus, so prominent in most reports, was not cultured in a single instance. Perhaps the influence of chemotherapy is manifest here; all of the patients were treated intensively with all of the sulfonamides.

TABLE 9
CULTURES

	Cases
1. None taken	10
2. Blood	
Negative	20
Positive	6
Staph. aureus pyogenes	3
Anerobic streptococcus	1
Saprophytic staphylococcus	1
3. Heart	
Negative	6
Positive	3
Anerobic *Strep. pyocyaneus*	1
Cl. welchii	1
Staph. aureus	1
4. Lung abscess	
Negative	1
(Peritoneum, vena cava, *Strep. fecalis*)	
Positive	2
Staph. aureus	2
(Blood negative)	
5. Peritoneum	
Negative	1
(Smear showed diplococci and rods)	
Positive	3
Pyocyaneus (at operation)	1
Strep. fecalis	1
Non-hemolytic strep.	1
6. Thrombus from vena cava	
Negative	0
Positive	1
(*Strep. fecalis*, and *Staph. aureus*)	
7. Thrombus from ovarian vein	
Negative	0
Positive	1
(*A. fecalis*, non-hemolytic strep., saprophytic staph.)	
8. Sputum	
Negative	0
Positive	2
Pneumococcus XVI	1
(Blood: *Staph. aureus*)	
Staph. aureus	1
9. Uterine tube	
Negative	0
Positive	1
(*E. coli.*)	
10. Skin abscess	
Negative	0
Positive—(anerobic streptococcus)	1
Negative	0
Positive	1
(Anerobic streptococcus)	

The one sterile lung abscess is interesting, as *Streptococcus fecalis* was demonstrated in the peritoneal cavity, and in the thrombus present in the vena cava. Local tissue immunity, chemotherapy, and the high concentration of oxygen in the lung may serve as possible explanations for the

sterile abscess. It has been noted previously, that patients being treated intensively with the sulfonamides tend to develop sterile lung infarcts, unless the infection is overwhelming. It is just as true, however, that the patients who submitted to venous ligation experienced quick resolution of their abscesses. Could these have been sterile? There is one case listed above, wherein a positive sputum was obtained, for type XVI. This was a postabortal case of staphylococcic septicemia, several positive blood cultures being obtained. Undoubtedly, the presence of the pneumococcus was just incidental, but it almost provoked the diagnosis of lobar pneumonia, until the blood cultures were reported. Had more sputum typings been done in the cases suspected of pneumonia, in all likelihood the pneumococcus would have been more often falsely accused.

VESSELS INVOLVED

The total number of vessels involved in the 41 cases was more than double the number of cases (table 10). In some instances, only one vessel was affected, but more often, two, and three vessels were the seat of pathology. The distribution deserves attention: we note a relatively high number of iliac and uterine veins involved. Halban and Kohler,[3] in their series of 82 fatal cases, found the following distribution, quoted in part:

"Combinations 31
Ovarian 19
Parametrial
Venous plexus 14
Vena cava 4
Uterine ..... 2"

TABLE 10
VESSELS INVOLVED

1. Ovarian		18
Right only	8	
Left only	0	
Bilateral	10	
2. Broad ligament (Pampiniform plexus)		10
3. Uterine		20
Right only	4	
Left only	3	
Bilateral	13	
4. Iliac		26
Right	13	
Ext.	3	
Int.	5	
Com.	5	
Left	13	
Ext.	3	
Int.	6	
Com.	4	
5. Uterine sinuses		7
6. Inferior vena cava		4
7. Renal		2
8. Femoral		2
9. Vesical		1
10. Endometrial (Cervical stenosis)		1
Total vessels involved		89

By contrast, Kerr[4] states that the postmortem examination of fatal cases reveals the uterines, and the iliacs to be much more frequently involved than the ovarians. The not infrequent involvement of the inferior vena cava, in both Kohler's and our own series, is of special significance, from a therapeutic standpoint. We feel that the factors of intra-uterine manipulation, the site of placental attachment, and the occurrence of cervical and perineal lacerations, largely determine which vessels will be involved.

SITES OF INFARCTION

Pulmonary infarction was found in 85 per cent of the cases in this series (table 11). Usually the infarction was silent, but when it produced symptoms, these were usually misinterpreted, and a diagnosis of bronchopneumonia made. Routine x-ray examinations of the chest on these cases, when the diagnosis of pelvic thrombophlebitis is first made, has almost invariably revealed multiple infarctions, some with abscess formation, despite lack of clinical symptoms. For this reason we believe the following policy should be established: Whenever pelvic thrombophlebitis may be

TABLE 11
SITES OF INFARCTION

1. Lung	35
2. Spleen	8
3. Kidney	5
4. Heart and pericardium	3
5. Brain	2
6. Pancreas	2
7. Liver	1

suspected, immediately have x-ray pictures taken of the chest. The results will be surprising.

Also to be noted are the two fatal brain emboli. As in other types of sepsis, epicardial infarction does occur, and may further confuse the picture.

ANALYSIS OF CASES

Analysis of the influence of operative intervention on the gross mortality cannot be deduced from this series, because only fatal cases were included, where the management was not operative at one stage or another (table 12). However, the literature, in general, accredits pelvic thrombophlebitis with a 50 per cent mortality, and at the same time, accredits operative intervention with the same mortality. Most authors adopt the attitude that "operative recoveries" merely represent patients who would have recovered without the operation, so that the gross mortality is unchanged by operation.

TABLE 12
ANALYSIS OF CASES

Cases not operated upon				30
Deaths	30*	Mortality	100%*	
Cases operated on				11
Deaths	4	Mortality	36.3%	
Cases of hysterectomy with ovarian and iliac vein ligation				
Deaths	1	Mortality	100%	
Cases of ovarian vein ligation				5
Deaths	2	Mortality	40%	
Cases of vena cava ligation				5**
Deaths	1	Mortality	20%**	

*Since cases were selected from death files, this is necessarily so, and does not indicate the true mortality, without operation.

**Three additional cases recently, raise the number to eight vena cava ligations, with no further deaths, giving a gross mortality of 12.5 per cent.

Study of these cases, and other reported series, would indicate that venous ligation, in the past, has been too late in the course of the disease, and has been entirely too conservative. Observe the difference in the mortality where more radical ligation is done. One of the cases of ovarian vein ligation was done four weeks after the onset of chills. Postmortem showed that the thrombi had extended into the renal vein, and inferior vena cava. In this instance, operation had been deferred too long, and the procedure had been too conservative. The patient died of the disease, not because of the operation. The same applies to the other case of ovarian vein ligation. Note this however; hysterectomy in these cases carries a high mortality, and should not be done, whenever it can be avoided.

The one death following inferior vena cava ligation was inevitable. Operation was decided on despite the moribund condition of the patient, when first seen. She had applied for treatment too late, but notwithstanding the fact that an operative mortality would be counted against the procedure, ligation was done to afford the patient her only possible hope. Death occurred at the termination of the operation.

CONCLUSIONS

1. Pelvic thrombophlebitis is both frequent and serious.

2. The diagnosis is difficult, even at autopsy.

3. Delivery, abortion, operation, and irradiation are the most frequent precursors.

4. No age group is exempt, except, perhaps childhood.

5. Repeated aerobic and anerobic blood cultures are necessary to establish the etiology. *Staphylococcus aureus*, and nonhemolytic streptococcus are frequent offenders.

6. The uterine veins, iliac veins, and inferior vena cava are frequently involved.

7. Pulmonary infarction is extremely common, and should be looked for, especially by employing the x-ray.

8. Ligation of the inferior vena cava results in a lowered mortality, as compared to other operative procedures.

9. Delay in operation, and over-conservatism result in unnecessarily high mortality.

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AUTOAGGLUTINATION, COLD AGGLUTINATION, PSEUDOAGGLUTINATION AND THE Rh FACTOR:

FACTORS OF PRACTICAL IMPORTANCE IN THE TRANSFUSION OF BLOOD

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Every physician knows the frequency with which reactions follow transfusions of apparently well matched blood. Every intern and laboratory technician knows that incompatibilities on direct matching of patients with donors of the same blood group are not rare. The minor reactions are overlooked, but in many cases they are only regretted and not explained. The technician reports the donor incompatible and goes on with the next matching, not stopping to determine why a donor of the same group should not match. Consideration of the factors discussed below will explain many intra-group incompatibilities and will prevent the occurrence of many post-transfusion reactions.

AUTOAGGLUTINATION AND COLD AGGLUTINATION

Landsteiner showed some years ago that the sera of practically all persons agglutinated their own cells at 0° C. "Pathological" cold agglutinins, also called "autoagglutinins," "panagglutinins," and "autohemagglutinins" differ from these normal cold agglutinins only in manifesting themselves at a higher temperature and in their frequent association with pathologic states. The agglutination at this higher temperature is due to an increase in titer of the normal cold agglutinin and not to any change in its essential nature.

The cold agglutinin or autoagglutinin is a true agglutinin, independent of the isoagglutinins of the common blood groups. It is non-specific: serum containing autoagglutinins will agglutinate not only its own cells but also the cells of all the four blood groups and cells of many laboratory animals. Hence the name "panagglutinin." The active principle may be absorbed by the patient's own cells or by group O cells, which contain no isoagglutinogens. It is effective in agglutinating red cells after dilution, usually to 1:4, sometimes as high as 1:2000. These two latter characteristics help rule out psuedoagglutination, or excessive rouleaux formation.

Boxwell and Bigger[5] in 1931 proposed an admittedly arbitrary definition of "autohemagglutination": "a clumping of erythrocytes into irregular masses visible to the naked eye, occurring in the presence of an individual's own serum, without bacterial action, at air temperature and reversible at body temperature." They reviewed the literature up to that time and accepted 22 cases as fulfilling these criteria. Reisner and Kalkstein,[14] in 1942, brought the collection up to date with a total of 54 cases. The cases reported here for illustration add two more.

However, this rigid definition, which was constructed to exclude pseudoagglutination and the Thomsen phenomenon (agglutination due to bacterial action) really obscures the actual frequency and practical importance of the autoagglutinins. As noted above, practically all persons show autoagglutination at very low temperatures. The titer of these agglutinins may be raised by many different pathologic processes, or in some apparently normal individuals, to show agglutination at higher temperatures. Only occasionally is the titer high enough to make the agglutinin effective at room temperature. (Room temperature varies with different investigators: Boxwell and Bigger gave 16° C.; others have given as high as 26° C.). In Reisner and Kalkstein's recent case autoagglutination occurred at 37° C.

The pathologic conditions in which autoagglutinins effective at room temperature have been reported include: hemolytic anemias, including those caused by sulfonamides; severe liver disease; absorption of hematomas; streptococcal infections; kala-azar; multiple myeloma; and poisoning by hydrocarbons, such as benzene. It is noted that most of these conditions are associated either with increased blood destruction or increase and/or alteration of the plasma

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proteins. Supposedly the destroyed red cells act as an antigen and stimulate the formation of appropriate antibodies. Alterations in the plasma proteins may increase the titer of the autoagglutinin or alter the conditions under which it acts; but also may confuse the reaction by increasing the tendency to pseudoagglutination.

Besides these conditions, which are the most frequent ones associated with autoagglutination at room temperature, a number of other more varied conditions are associated with an increase of the autoagglutinin titer to a lesser degree. Belk's[3] quantitative investigation of a large series of patients indicates that one patient in five who is sick enough to need a transfusion will have in his blood autoagglutinins of sufficient strength to make post-transfusion reaction a possibility. These autoagglutinins will not be apparent in the routine cross-matching as they are active only at a low temperature.

According to many authors, the significance of the autoagglutinins lies in the possibility of their confusing typing and matching reactions. For example, as illustrated in case 1 below, in testing the serum of a patient containing autoagglutinins active at room temperature, the serum might be erroneously classified as belonging to group O, since it would agglutinate the test cells of both groups A and B. Likewise if unwashed cells, or cells washed at room temperature were used in the typing the patient might be erroneously classified as group AB, since the cells would agglutinate in both A and B test sera because of the absorbed autoagglutinin. Similarly no donor would be found compatible if serum collected at room temperature or unwashed cells were used in the cross-matching. A true reaction could only be obtained by some process designed to free the cells or the serum of the autoagglutinin: (1) Using serum separated at 0° C., at which temperature the autoagglutinin is most active and would be absorbed on the patient's own cells; (2) using cells washed several times in warm (40° C.) saline, at which temperature the autoagglutinin is inactive and can be removed; (3) carrying out typing and matching reactions in an incubator at 37° C., at which temperature the autoagglutinin is inactive. The following case illustrates how autoagglutinins may cause confusion in typing and matching:

CASE No. 1

A. F., a 6 year old female, was admitted to the French Hospital on May 14, 1942. Two weeks previously she had a typical attack of acute lobar pneumonia of the right upper lobe. She was treated in her home with sulfathiazole, which brought marked apparent improvement. However, dulness and rales persisted in the right upper lobe and she continued to have low grade fever. History, physical findings, and roentgenograms indicated in addition a congenital malformation of the heart, probably interventricular septal defect. She was a pale, fragile child, but apparently well on admission. Chest plates showed an area of pneumonitis in the lower portion of the right upper lobe, suggestive of the consolidation of pneumonia. The tuberculin test was negative. Chest plates 12 days later showed no change from previous films. The patient was discharged with a diagnosis of unresolved pneumonia.

Blood studies: Red blood cells 3.18 million; white blood cells 7500. Thin smears were made without difficulty. Thick smears for malaria could not be made at room temperature because the red cells rapidly grouped themselves into large irregular clumps. The patient's red cells, washed at room temperature, were agglutinated by both A and B test sera at room temperature (20° C.), indicating that the patient belonged to group AB. The patient's serum, separated at room temperature, agglutinated test cells of both groups A and B, indicating, to the contrary, that the patient belonged to group O. However, the patient's serum was found to agglutinate her own cells, and also the cells of group O at room temperature. This agglutination of the patient's own cells and group O cells, which occurred readily at room temperature, was reversed by incubation at 37° C. When the patient's cells were washed with warm saline (40° C.) and tested with A and B sera; or when the typing was carried out in the incubator at 37° C., no agglutination occurred. When the patient's serum was separated from its cells by centrifuging in an ice pack it did not agglutinate group O cells; or the cells of the patient herself, if they had been washed in warm saline. When the patient's serum, separated at room temperature, was mixed with an equal volume of cell mush of group O cells and then separated in an ice pack it did not agglutinate group O cells or the patient's own cells which had been washed in warm saline.

Obviously the patient's serum contained an autoagglutinin, active at 20° C. and in-

active at 37° C. The patient really belonged to group O, but the typing reaction was at first confused by autoagglutinin absorbed on the red cells causing agglutination of the patient's cells in test sera of groups A and B. True reactions could be obtained by removing the autoagglutinin by the methods described above; or by absorbing it on group O cells, which contain no isoagglutinogens and therefore will not alter the isoagglutinins of the serum.

Although the confusion of typing and matching reactions makes the autoagglutinins sufficiently important to warrant consideration, the author emphasizes the conclusions of Belk[3]: that autoagglutinins account for the majority of intra-group incompatibilities and the majority of post-transfusion reactions. Belk recommends that no more than 100 c. c. of blood be given at any one time to a patient showing autoagglutination. That reactions may occur in a patient showing autoagglutination and receiving a transfusion of blood demonstrated compatible at room temperature is illustrated in the following case:

CASE No. 2

Mrs. R. C., 86 years old, was admitted to the French Hospital on May 9, 1942, after a fall on her hip. The clinical diagnosis, confirmed by roentgenograms, was impacted fracture of the neck of the right femur. Light traction was applied and the patient was allowed to sit up the next day. Traction was replaced by a brace two weeks later. However, the hip never became painless and good function never returned. The patient became progressively weaker; developed decubital ulcers; and died 6 weeks after admission of hypostatic pneumonia.

Blood studies: Three weeks after admission the patient's red cell count was 2.20 million and transfusion was ordered. The patient's cells, washed at room temperature, showed agglutination at room temperature in test sera of both groups A and B, indicating that the patient belonged to group AB. Three group AB donors were cross-matched with the patient using cells washed at room temperature and sera separated at room temperature. The patient's cells were not agglutinated in the sera of any of the donors. The patient's serum agglutinated the cells of two donors. The third donor was apparently compatible. Blood from this donor was given to the patient by the indirect method. When 100 c. c. had been introduced, in the course of an hour, the patient had a chill with a rise in temperature to 102° F. Immediately after the chill occurred further blood studies were carried out. The patient's serum, separated at room temperature, was found to agglutinate the donor's cells and the cells of all the human blood groups at 16° C. or below. These agglutinations reversed on warming to 20° C. or higher. The patient's cells, washed at room temperature, were found to be agglutinated at 16° C. by the sera of all three of the group AB donors previously tested; these agglutinations reversed on warming. The patient's cells, washed at room temperature, were agglutinated at 16° C. by the patient's own serum; the reaction reversed on warming. The patient's cells were washed 6 times in saline at 40° C. to remove the autoagglutinin which was obviously present. These cells were still agglutinated by test sera of both groups A and B, at room temperature and 37° C., but did not agglutinate in the sera of any of the group AB donors, even at 5° C. The patient's serum, when separated from the patient's cells at 0° C., did not agglutinate the patient's own cells, or the cells of any of the human blood groups at temperatures as low as 5° C. The autoagglutinin could also be absorbed from the patient's serum by mixing with an equal volume of group O cells and separating at 0° C.

It is obvious that this patient's serum contained autoagglutinin of sufficient strength to be consistently active at 16° C. This autoagglutinin was responsible for the intra-group incompatibility of the first two donors; and probably for the post-transfusion reaction. It did not, however, confuse the typing reaction. The cells, when freed of autoagglutinin, still showed group AB reactions. That the patient really belonged to group AB is confirmed by the absence in the patient's serum of isoagglutinins for the cells of other groups after the autoagglutinin was absorbed either by the patient's own cells or group O cells, which do not contain isoagglutinogens. If 16° C. may be accepted as air temperature, as given in the original work of Boxwell and Bigger, this case also fulfills their criteria for autohemagglutination.

PSEUDOAGGLUTINATION

Pseudoagglutination, which is another name for excessive rouleaux formation, is capable of causing confusion in blood typing. It has not been demonstrated to have any influence of itself in the production of post-transfusion reactions. As indicated by its name, no true agglutinin is concerned in the process. Absorption cannot be dem-

onstrated. For practical purposes, pseudo-agglutination may be distinguished from true agglutination by its inactivation by slight dilution (1:2 or 1:4) and agitation; and by careful microscopic examination of the clumped red cells. For the latter criterion the author can certainly do no better than to refer the reader to the illustrations accompanying Coca's paper,[7] which are also reproduced by Wiener.[15]

THE Rh FACTOR

Landsteiner and Wiener[10] in 1940 first demonstrated an agglutinable factor (agglutinogen) present in human blood which was recognized by testing human red cells with the sera of rabbits previously immunized by the injection of Rhesus monkey blood. Most humans (85 per cent) were found to possess this agglutinogen and were designated Rh positive. The rest (15 per cent) lacked this agglutinogen and were designated Rh negative.

Since then it has become apparent that the transfusion of an Rh negative patient with Rh positive blood may cause the production of anti-Rh antibodies against the introduced Rh agglutinogen. If the patient then receives a second transfusion of Rh positive blood a reaction may occur. There are several explanations why such reactions are not more frequent: (1) Not all of the 15 per cent of persons who are Rh negative are able to produce anti-Rh antibodies when Rh positive blood is introduced; (2) subsequent transfusions of Rh positive blood are not given; (3) the antibodies, once produced, decrease in titer and finally disappear ;(4) these reactions are laid to other causes.

Additional practical importance has been given to the Rh factor by the discovery of its role in the etiology of erythroblastosis fetalis. Levine and Stetson[11] suggested in 1939 that a dominant immunizing property in the blood and/or tissues of the fetus was inherited from the father in cases of erythroblastosis fetalis. Levine, Burnham, and others[6, 12, 13] showed in 1941 that this dominant immunizing property was the Rh agglutinogen. Levine showed that 91 per cent of mothers of infants with erythroblastosis were Rh negative, in contrast to the normally expected 15 per cent; and that 100 per cent of the infants and fathers were Rh positive. The fetus inherits from its father an antigen, the Rh agglutinogen, which is found in the fetal red cells but not in the red cells of the mother. This antigen from the Rh positive fetus gains access to the mother's blood and stimulates the formation of anti-Rh antibodies. These antibodies, like other maternal antibodies, pass easily through the placenta and attack the fetal red cells, producing erythroblastosis fetalis. Thus a woman who is pregnant, or has been recently pregnant, may possibly have antibodies against Rh positive cells without having had a previous transfusion. Should such a woman receive a transfusion of Rh positive blood these antibodies would agglutinate and hemolyze the transfused cells, causing a reaction. Rh studies are indicated when a transfusion is to be repeated and in any case in pregnancy or the puerperium.

Anti-Rh antibodies are only rarely evident in routine cross-matching at room temperature. The reaction is most pronounced at ice box temperature. Accordingly these reactions may occur between bloods of the same group, in spite of an apparently compatible cross matching at room temperature, as illustrated in the following case:

CASE No. 3

Mrs. C. A., 33 years old, was admitted to the French Hospital on February 21, 1942. She had two children living and well. Her last pregnancy had ended in abortion, cause unknown, at the third month. At the time of admission she was in her eighth month of gestation. For the previous three months she had had intermittent vaginal bleeding, usually after exertion. About two hours before entering the hospital she felt a violent fetal movement, which was followed by gushing, painless hemorrhage amounting to about 300 c. c. Several clots were removed from the vagina but no further bleeding occurred. Physical findings were those of a woman about seven and a half months pregnant. Her pulse was 84 per minute. Abdominal palpation indicated an ROP position of the fetus. Fetal movements were felt. Fetal heart tones were heard at a rate of 125 per minute. Roentgenograms showed pregnancy of seven and a half to eight months' duration with cephalic presentation and fetal spine to right. Soft tissue films and

cystogram showed no evidence of placenta praevia. The next day no fetal movements were felt and no fetal heart tones were heard. The patient was matched for transfusion and discharged. She was readmitted seven days later, and after a labor of only a few hours delivered a macerated fetus by frank breech. The fetus showed no enlargement of the liver or spleen and no jaundice. No autopsy was performed and no studies of the fetal blood were made. The placenta showed several old infarcts. On the maternal surface was a well attached blood clot covering about one-third of the placental area. The umbilical cord was very hemorrhagic and swollen. Postpartial bleeding was small in amount but the patient appeared pale and weak. Her pulse was 100 per minute. She was matched again for transfusion. Matching was carried out at room temperature using cells washed at room temperature. Over the course of one hour, 550 c. c. of blood were given to the patient by the indirect method from an apparently compatible donor. Almost as soon as all the blood had been given the patient had a hard chill and her temperature rose to 104.2° F. She was restless, air-hungry, disoriented, and talked irrationally. Her pulse was 160 per minute. Her blood pressure was 75/30. Coramine and an infusion of normal saline were given. Within eight hours her temperature fell to normal. She was discharged seven days later. Three months later this case was brought to my attention and further studies were made on the patient and the donor.

Blood studies: Both the patient and the donor were found to belong to group O. Cross-matching showed the donor's blood to be compatible at room temperature. When crossmatching was carried out in the ice box at 10° C., it was found that the patient's serum agglutinated the donor's cells readily. The patient's cells were not agglutinated by the donor's serum in the ice box. Autoagglutinins were not demonstrated in either the patient or the donor.

Although erythroblastosis fetalis was not demonstrated in the fetus, and although the husband was not available for Rh studies, this case is typical of the Rh reactions that may occur in a pregnant or puerperal woman.

Therefore it is necessary to test the donor's cells against the patient's serum at icebox temperature.[16] At the same time the patient's cells must be tested against his own serum at ice box temperature in order to rule out an agglutination due to cold agglutinins. If the patient's cells are agglutinated in his own serum, the autoagglutinin must be removed by absorption with the patient's own cells; and separating the serum at 0° C. by centrifuging in an ice pack. The Rh agglutination may then be repeated, again with a control of the patient's cells and serum.

CONCLUSIONS

1. Cells washed in warm saline, to remove possible autoagglutinins, should be used in typing and matching blood.

2. Before a patient receives a transfusion the patient's serum should be tested against his own cells at ice box temperature to detect autoaggulations which may cause a post-transfusion reaction. If autoagglutinins are demonstrated the patient should receive blood only in small amounts.

3. When a transfusion is to be repeated, or when a transfusion is to be given in pregnancy or the puerperium, compatibility tests should be made at ice box temperature in order to exclude Rh agglutinins.

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THE EMBLEMS OF MEDICINE

JAMES A. DURAND, M. D.

BATON ROUGE

Man is an animal that symbolizes and who often lives, thinks and acts in turns of symbols. Two symbols have been handed down the ages as the distinctive emblems of the medical profession. They are the magic wand, or Caduceus, of Mercury and the knotted staff and serpent of Aesculapius. It should be of interest to every physician to learn of the origin and significance of these medical emblems, and how they came to be used by men of the healing art. The general public has become familiar with the emblems, as displayed by the physicians on their automobiles, and insignia worn by the medical branches of the U. S. Army.

Man's history goes back into the days of mythology. Medicine was there with man in those mythologic times, when most of life was a mystery, and man in his wonderment worshipped that great expanse of his unknown and called each wonder a god. The emblems of medicine originated in those mythologic days of many gods.

THE CADUCEUS

The Caduceus which is a wand or slender staff around which are loosely coiled two snakes has at its head two outspread wings. The definition of Caduceus means "herald's wand." The Caduceus was given by the god physician Apollo to Mercury upon the appointment of Mercury as an ambassador to mediate between the gods and man. It has become the magic wand of Mercury, the heavenly messenger of the gods. Mercury is also known to some as the God of Commerce. The Caduceus is a wand from an olive branch signifying peace and the outstretched wings at its head indicate speed and fleetness for the messenger Mercury. The two snakes intertwined about it indicate wisdom for the ambassador. The Roman army used it as a flag of truce, a symbol of neutrality or peaceful transactions between opposing armies on the battle front. There is no indication that the Caduceus was ever thought in those days to be the emblem of the healing art; however, the fact that it was given to him by Apollo, the god physician, has given rise in some quarters that the Caduceus has a medical significance. It was not until the reign of King Henry VIII that Sir William Butts (....-1545), personal physician to the king, adopted the Caduceus as his emblem for the medical profession. This is the first record of a physician using the Caduceus for this purpose. A few years later Dr. John Caius presented to Granville and Caius College of Cambridge, England, a silver Caduceus as an emblem of medicine.

THE STAFF OF AESCULAPIUS

There lived in the early days of Greece a great physician by the name of Aesculapius, son of the physician god Apollo, who spent his life tirelessly in the service of the sick. His skill in the art of healing has placed him forever before us as the Father of Medicine.

The staff of Aesculapius, a stout knotted staff with a single snake closely entwined around it, is medicine's oldest emblem. The staff was stout so that the lame could lean upon it; it was knotted to indicate the knotty problems of illness and it had wound about it a snake, symbol of healing, renewal of youth and prolongation of life.

The association of the serpent with medicine roots deep in antiquity of the race. The ancient sign of wisdom and healing was the snake, which represented immortality or renovation of life and vigor, typified by the periodic shedding of its skin.

Several legends have grown up in explanation of how the snake became an attribute of Aesculapius. One states that a snake came to him bearing in his mouth a magic herb by means of which he was able to perform all sorts of medical miracles.

Another one has it that Aesculapius at the bedside of his patient, Glaucus, had a snake come to him and twine itself about his staff, imbuing him with wisdom and enabling him to effect a cure. It can be readily understood why it is that all the pictures and statues of Aesculapius show him holding a snake or grasping a stout knotted staff around which is a tightly clinging snake.

With this historic mythologic background, physicians naturally feel that they have a unique and incontrovertible right to the use of the staff of Aesculapius as a very significant emblem of the profession of medicine.

CONCLUSIONS

Two snakes closely entwined about a staff, with or without wings attached is properly a Caduceus or staff of Mercury. One snake about a knotted staff represents the staff of Aesculapius.

The use of either emblem seems to be highly appropriate to medicine, although the staff of Aesculapius seems to have the most ancient and significant background while for balance and artistic effect, the Caduceus may well be preferred.

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THE STATE MEETING

Elsewhere in the Journal there appears a notice to the effect that the president and the executive committee have decided that the annual meeting of the State Medical Society this year should be largely a business meeting and without any scientific program. The reasons for this action of course are obvious. Louisiana has sent a very large number of its doctors to the armed services, the men who are left behind are laboring at full speed and doing an enormous day's work. In many of our localities the doctors have been so reduced in number that it would be utterly impossible for them to leave their patients except for a very short period of time. Furthermore, the gasoline and rubber situation is such that it will help to conserve these two essential substances, more particularly rubber, if the meeting is a relatively limited one in size.

The Journal Committee feels that in spite of the deletion of the scientific program, that there will be a certain number of physicians in the state who would like to have presented their observations on diseases they have seen or special studies that they may have made. The Journal wishes to offer its pages to any doctor who will not be able to read a paper before the State Meeting, to have it published in the Journal. In this way the material would reach the eyes if not the ears of the medical profession; some excellent clinical studies would not be lost but would become known. If, therefore, any physician in the state has material he would like to publish in the Journal, we trust that he will not be too modest but will submit it to the editor for publication.

GRADUATE MEDICAL ASSEMBLY

For the seventh successive year the New Orleans physicians will present their annual medical assembly, this year, in the week of March 15. The meeting promises fair to exceed the successful meetings that have been held in the past. The officers of the Graduate Medical Assembly have prepared a most interesting program of lectures, clinics, conferences, motion pictures and round table discussions.

To participate in this program there is a list of superb guest speakers. Without exception every one of these speakers is a man who is outstanding in his specialty. In pathology, for instance, Dr. Howard T. Karsner, whose textbook on pathology is so popular and who is professor of pathology at Western Reserve University, is going to conduct the clinico-pathologic conference, as well as to lecture on two subjects of general interest. The medical man who is to

be associated with Dr. Karsner in this conference will be Dr. Louis Hamman. Those who have heard Dr. Hamman talk know he is a man tremendously well versed in medicine and he is a practitioner of medicine par excellence. In cardiology, Dr. Tinsley R. Harrison, professor of medicine at the new Bowman Gray School of Medicine, is down for four different presentations, each of which should be of interest not only to the cardiologist but to the general practitioner.

Dr. Robert J. Crossen of Washington University is a nationally known figure not only for his interest in general professional problems but also because of his textbook on gynecology which is used by most of the medical schools in the country. In obstetrics, Dr. Nicholson J. Eastman, who is obstetrician in chief and professor of obstetrics at Johns Hopkins, will talk on subjects which should prove profitable to each and every one of his listeners.

In pediatrics, Dr. Erling S. Platou of the University of Minnesota Graduate School, will have as his subject the treatment of acute meningitides, and human serum and plasma therapy in diseases of children. Dr. George B. Eusterman, of the Mayo Clinic, needs no introduction to gastroenterologists, nor to most physicians. The same might be said of Dr. Charles B. Huggins, professor of surgery at the University of Chicago, and Dr. Ralph I. Lloyd, president of the American Academy of Ophthalmology and Otolaryngology. Representing radiology will be Dr. Fred J. Hodges of the University of Michigan Medical School, another man known widely throughout the country as an outstanding radiologist. Dr. Warren H. Cole, professor of surgery at the University of Chicago and Major R. A. Griswold, professor of surgery at the University of Louisville, will represent their particular field. Other most prominent speakers will be Dr. Edwin W. Ryerson of Chicago, Dr. James G. Townsend of the National Institute of Health, Lt. Col. Roy G. Spurling, a neurosurgeon now in active service, and Lt. Col. Edgar V. Allen, who is also in the army as medical consultant for the Seventh Service Command. In otolaryngology Dr. John J. Shea of Memphis needs no introduction to Southern doctors. Lastly, Sister Elizabeth Kenny will give two talks on the subject that she knows so well, namely poliomyelitis.

With the group of doctors such as have been enumerated above as the basis for the program of this annual medical assembly, one can say without hesitation that the meeting will be one of the outstanding educational medical meetings that will be held in this country this year. It might be well to call to the attention of the Louisiana medical profession the fact there will not be any scientific meeting of the Louisiana State Medical Society this year and this present meeting might well act as a substitute to replace the usual scientific program of the State Society.

It is realized and appreciated that doctors are busy now, busier than they have ever been before but it would be well for them to take the opportunity of attending this meeting to learn and at the same time to have a few days of rest and relaxation from their very strenuous day by day routine activities.

THE CLINICAL USE OF THE SULFONAMIDES

The sulfonamides have become ever increasingly popular in the treatment of any disease or disorder which is associated with fever. They are being used extensively for prophylactic purposes and have, under certain conditions, proved of tremendous value, but merely because a patient does have an increased temperature or is threatened with a sore throat, is no reason why the sulfonamides should be given to that particular individual. There are certain conditions in which the sulfonamides are of no value and in fact they may be actually dangerous. Potentially they are dangerous therapeutic agents and should not be given without very definite indications and reasons.

In some conditions the sulfonamides are not only useless but may make the patient unhappy and miserable and may actually

complicate his illness. The doctor should not be moved by the incorrect information that is so general among laymen that the sulfonamides are useful in every type of febrile disorder. He should not hesitate to explain to the patient's family that in certain infections the drugs are actually contraindicated. Such diseases include virus pneumonia, influenza, the common cold, the acute exanthemata, infectious mononucleosis, typhoid and typhus fever, infections due to neurotropic virus, the toxic expressions of scarlet fever and diphtheria, and puerperal infections caused by anerobic streptococci. In tularemia, brucellosis and acute rheumatic fever the sulpha drugs are probably totally useless, certainly harmful in the last mentioned disease.

The sulfonamides have been given repeatedly for sore throats. They are of very little value against the hemolytic streptococcus and in localized infections, once they are definitely encapsulated, they are ineffective.

It must be stressed emphatically that the sulfonamides should not be used promiscuously. If a severe infection does exist with high fever and a bacteriologic diagnosis cannot be made, then one is justified in making use of these valuable drugs. It is recommended, that they be used in spite of the fact that there is a 0.2 per cent mortality from the sulfonamides. With severe disease a trial is justified. If, at the end of three days with ample dosage of one or another of the preparations, there is no improvement in the patient then it is wise to discontinue the use of the preparation, assuming of course that dosage is adequate and the patient is actually taking the drug. Blood sulfonamide concentration tests are frequently unavailable to the practitioner. An excellent response to therapy is probably as valuable proof that the blood concentration is at the right elevation as definite figures for the concentration. If the patient does not respond to the drug in three days or when the output of the urine cannot be accurately estimated because of incontinence or poor renal function, then blood concentration levels are definitely indicated and if they cannot be obtained it is advisable to cease using the sulfonamides.

The preparation of choice for nearly all infections is sulfadiazine, because of its lack of side effects and because of its relatively fair excretion. Even in the treatment of meningitis, in spite of the fact that the concentration of the drug in the spinal fluid is lower than would be sulfanilamide or sulfapyridine which have been advocated for the treatment of pneumococcal meningitis or streptococcus meningitis, the clinical result with sulfathiazole has been efficacious and has given better results than the first two preparations. Sulfathiazole is probably the best preparation in the handling of staphylococcal infections and in the management of the urinary tract and venereal infections as well as anthrax and subacute bacterial endocarditis.

The problem arises of how long to continue with the sulfonamides. A general rule is to continue full dosage until 48 hours after all evidence of infection has gone or in the instance of pyogenic disorders until localization has taken place and adequate drainage has been secured. In the instance of diseases which are cured by sera and they are used, it should be continued until sufficient anti-body has been formed to effect a cure. Whenever it is impossible to determine that localization of infection has taken place as in osteomyelitis or mastoiditis, therapy should be continued for a very much longer period of time after the subsidence of temperature. It is advisable also in the instance of streptococcic or staphylococcic infections to continue for a much longer time than with pneumonia, for example. In erysipelas and cellulitis, even after the temperature has fallen to a normal line, the drug should be continued until after the subsidence of the local disease expression.

Complications of sulfonamide therapy will not be discussed but it should be emphasized that patients should be questioned to find out if they have been given any of

these preparations prior to the institution of the proposed therapy. Patients should be questioned as to disturbances of renal function such as nycturia and the history of a previous nephritis, and if possible, a red and white blood cell count should be done. Under any circumstance while the patient is taking the drug he should take large quantities of fluid and the urinary output should be carefully observed.

TRANSACTIONS OF ORLEANS PARISH MEDICAL SOCIETY

February 1. Orleans Parish Medical Society, Board of Directors, 8 p. m.

February 2. Eye, Ear, Nose and Throat Staff, 8 p. m.

February 3. Clinico-pathologic Conference, Charity Hospital Morgue Amphitheater, 1:30 p. m.
Mercy Hospital Staff, 8 p. m.
Clinico-pathologic Conference, Marine Hospital, 7:30 p. m.

February 4. Clinico-pathologic Conference, Touro Infirmary, 11:15 a. m. to 12:15 p. m.
Baptist Hospital, Executive Meeting, 8 p. m.

February 8. Orleans Parish Medical Society, Scientific Meeting, 8 p. m.

February 10. Clinico-pathologic Conference, Charity Hospital Morgue Amphitheater, 1:30 p. m.
Women's Auxiliary, Orleans Parish Medical Society, Orleans Club, 3 p. m.
Touro Infirmary Staff, 8 p. m.

February 15. Hotel Dieu Staff, 8 p. m.
Clinico-pathologic Conference, Baptist Hospital, 8. p. m.

February 16. Charity Hospital Medical Staff, 8 p. m.

February 17. Clinico-pathologic Conference, Charity Hospital Morgue Amphitheater, 1:30 p. m.
Clinico-pathologic Conference, Marine Hospital, 7:30 p. m.
Charity Hospital Surgical Staff, 8 p. m.
Clinico-pathologic Conference, Hotel Dieu, 8:15, p. m.

February 18. Clinico-pathologic Conference, Touro Infirmary, 11:15 a. m. to 12:15 p. m.

February 19. I. C. R. R. Hospital Staff, 12:30 p. m.

February 23. Baptist Hospital Staff, 8 p. m.

February 24. Clinico-pathologic Conference, Charity Hospital Morgue Amphitheater, 1:30 p. m.
French Hospital Staff, 8 p. m.
Hutchinson Memorial Clinic Staff, 8 p. m.

February 25. Clinico-pathologic Conference, Touro Infirmary, 11:15 a. m to 12:15 p. m.

February 26. L. S. U. Faculty Club, 8 p. m.
New Orleans Hospital Dispensary for Women and Children Staff, 8 p. m.

During the month of January the Society held two meetings. The first meeting was the installation meeting, and was held January 11 on the Jung Hotel roof. At this meeting the following officers were installed: Dr. H. B. Alsobrook, president; Dr. Edwin L. Zander, president-elect; Dr. George H. Hauser, first vice-president; Dr. Philip H. Jones, Jr., second vice-president; Dr. Walter Levy, third vice-president; Dr. Daniel J. Murphy, secretary; Dr. A. V. Friedrichs, treasurer; Dr. Max M. Green, librarian; Drs. Paul B. Lacroix, E. L. Leckert, and E. J. Richard, additional members of the Board of Directors. The second meeting was a regular meeting. At this meeting Dr. C. Anderson Aldrich, Chief of staff, Children's Memorial Hospital, Chicago, Illinois, addressed the Society; his subject was, The Development of Usefulness in Children.

Drs. Rena W. Crawford and G. Richarda Williamson presented a paper on Anemia in Childhood at the December meeting of the Baptist Hospital Staff.

Dr. H. Theodore Simon presented a paper on the Treatment of Fractures of the Neck of the Femur at the December meeting of the Hotel Dieu Staff.

DANIEL J. MURPHY, M.D.,
Secretary.

LOUISIANA STATE MEDICAL SOCIETY NEWS

CALENDAR

PARISH AND DISTRICT MEDICAL SOCIETY MEETINGS

Society	Date	Place
East Baton Rouge	Second Wednesday of every month	Baton Rouge
Morehouse	Second Tuesday of every month	Bastrop
Orleans	Second Monday of every month	New Orleans
Ouachita	First Thursday of every month	Monroe
Rapides	First Monday of every month	Alexandria
Sabine	First Wednesday of every month	
Second District	Third Thursday of every month	

ANNUAL MEETING OF THE LOUISIANA STATE MEDICAL SOCIETY

The Executive Committee of the State Society has decided to dispense with the scientific program and entertainment features, and will have only a business meeting at the annual meeting of the Society in May. It thought this was a wise thing to do owing to the present conditions resulting from the war. The business meeting will be held the morning and afternoon of May 3, 1943, in Baton Rouge. On the evening of May 3 the Presidential Address, the Annual Oration, and the presentation of medal to the Retiring President will be held. Plans and other details are being arranged by the East Baton Rouge Parish Medical Society in co-operation with the Executive Officers.

A program covering all the details of the meeting will be mailed to every member of the State Society in adequate time for those interested. While this is a business meeting the Executive Officers would be glad to have all those who can attend this abbreviated convocation.

DUES OF MEMBERS IN SERVICE

At the last meeting of the Executive Committee of the State Society the question of collection of dues for members of the Society who are in the armed forces was discussed.

It was brought out in the discussion that the Rapides Parish Medical Society has adopted a policy whereby the dues for membership in the State Society are paid for the men in service by the doctors who are still in civilian practice. This was regarded, by the Executive Committee, as a constructive and patriotic plan and is referred to the various other component societies for consideration.

OUACHITA PARISH MEDICAL SOCIETY MONROE, LOUISIANA

At the regular meeting of the Ouachita Parish Medical Society on December 3, 1942, the following officers were elected to preside for the year 1943:

Dr. Glenn T. Gallaspy, President
Dr. W. E. Jones, Vice-President
Dr. G. A. Varino, Secretary-Treasurer

The first meeting in 1943 was held on January 14, 1943, at 7:30 p. m. at the St. Frances Sanitarium, Monroe, Louisiana. A short program was had. A motion picture on "The Diagnosis and Treatment of Breast Tumors" was shown by Dr. A. D. Tisdale on behalf of the Medical Society. There being no further business before the Society, the meeting was adjourned.

The next meeting will be held on February 4, 1943, at 7:30 p. m. at the St. Frances Sanitarium Monroe, Louisiana.

GLENN T. GALLASPY, M. D.
President
G. A. VARINO, M. D.
Secretary-Treasurer

DR. MATAS HONORED

On Sunday, December 21, 1942, Dr. Rudolph Matas was presented the medal of the Nu Sigma Nu Degree of Merit. This award, the highest honor conferred by Nu Sigma Nu, is the culmination of approximately thirty years of service which Dr. Matas has rendered the fraternity as a faculty member of Beta Iota Chapter of the Tulane Medical School, including president of the National Honorary Council in 1935.

The medal was presented by Dr. O. C. Cassegrain (Tulane, 1915), president of the alumni group, at the local chapter house, following cancellation of the national convention which was to have been held in Denver, Colorado, in November. The only other recipients of the medal, all illustrious representatives of the medical profession in their respective fields, have been: Victor Vaughan, Nicholas Senn, J. P. McMurrich, W. H. Welch, F. G. Novy, G. C. Huber, W. H. Park, J. M. T. Finney, T. H. Sollman, and James Bryan Herrick.

Following the presentation, Beta Iota Chapter of Nu Sigma Nu entertained members of the faculty of the Tulane Medical School and friends at a reception in Dr. Matas' honor.

TOURO INFIRMARY

The annual meeting of the Medical Staff of Touro Infirmary was held on Wednesday, January 13, at 8 o'clock in Lecture Room A. The scientific program consisted of a clinico-pathologic conference with a clinical discussion by Dr. A. F. Hebert. Dr. Donovan C. Browne then discussed "The Patient Following Gastric Surgery," and the meeting was closed by the report of a case of Raynaud's disease presented by Dr. H. Mahorner. The annual election to the Executive Committee of the two representatives from the Staff was held and Dr. Sidney Copland and Dr. Waldemar Metz were selected.

BAPTIST HOSPITAL

The regular monthly meeting of the Clinical Staff of the Southern Baptist Hospital was held on Tuesday, January 26. The program consisted of a presentation of a case by Dr. E. A. Ficklen and one by Dr. J. T. O'Ferrall, both of which were generally discussed. Following the death report, election of officers for the coming year was held. This resulted in Dr. P. H. Jones being elected chairman; Dr. R. F. Sharp, vice-chairman; Dr. Joseph W. Reddoch, secretary; Dr. Joseph H. Wells, treasurer.

ANNUAL MEETING OF S.M.A.

The Council considered whether or not the Association should hold its meeting next year and where. It is the unanimous judgment of the Council that unless there are conditions which are not now evident that the Association should meet next year at its usual time. It was thought wise to leave to the Executive Committee of the Council the selection of the meeting place, this to be done at their meeting to be held about six months hence.

At a recent meeting of the Association, Dr. T. A. Watters of New Orleans, was elected Chairman of the Section on Neurology and Psychiatry; Dr. Grace A. Goldsmith of New Orleans was elected Vice-Chairman of the Section on Medicine; Dr. Nathan H. Polmer, New Orleans, was elected Vice-Chairman of the Section on Physical Therapy; Dr. John T. Sanders, New Orleans, was made Vice-Chairman of the Section on Gynecology; Dr. Joseph S. D'Antoni, New Orleans, was elected Secretary-Treasurer of the American Society of Tropical Medicine; Dr. Ernest Carroll Faust, New Orleans, was made Secretary of the American Academy of Tropical Medicine.

Dr. Virginia E. Webb, former chief of the Division of Maternal and Child Welfare of the State Department of Health, resigned from this position and has moved to Mobile, Alabama, to go into private practice.

"FOUNDATION PRIZE" OF THE AMERICAN ASSOCIATION OF OBSTETRICIANS, GYNECOLOGISTS AND ABDOMINAL SURGEONS

The award which shall be known as "The Foundation Prize" shall consist of $150.00.

Eligible contestants shall include only (a) interns, residents, or graduate students in Obstetrics, Gynecology or Abdominal Surgery, and (b) physicians (with an M. D. degree) who are actively practicing or teaching Obstetrics, Gynecology or Abdominal surgery.

For additional information write Jas. R. Bloss, M. D., Secretary, 418 Eleventh Street, Huntington, West Virginia.

OPENING OF REST HOME FOR TORPEDOED SEAMEN

On Monday January 11, under the auspices of the United States Public Health Service, Mr. George H. Terriberry, Chairman of the New Orleans Port Area Committee, United Seamen's Service, and Captain Roger J. O'Sullivan, Regional Representative, Recruitment and Manning Organization, War Shipping Administration, a rest home for torpedoed seamen was opened at Pass Christian. This rest home is located at Camp Kittiwake, a truly beautiful site. The rest home is for the purpose of giving the torpedoed seamen an opportunity of recovering from the psychic trauma developing as a result of the experiences in being blown up by an enemy torpedo. It has been found that a week or two weeks of complete rest and relaxation will be of great psychological value to the men to whom our country is indebted to a tremendous extent. Too little attention has been paid to these brave seamen, and what little has been done for them is much too little.

The speaker of the occasion was Mr. Marshall E. Dimock, Director of Recruitment and Manning Organization.

INFECTIOUS DISEASES IN LOUISIANA

The Section of Epidemiology of the Louisiana State Board of Health shows that for the week ending December 12 there were reported 386 cases of syphilis, 151 of gonorrhea, 55 of chickenpox, 26 of pulmonary tuberculosis, and 13 of influenza. No one other of the reportable diseases occurred in the state in numbers greater than 10. There were, however, three cases of typhus fever reported this week among the unusual diseases, and five instances of malaria. The next week which closed December 19, the diseases occurring in double figures included 290 cases of syphilis, 82 of gonorrhea, 18 of mumps, 12 of pulmonary tuberculosis, and 11 of chickenpox. Two additional cases of typhus fever were reported this week and one of malaria. For the week which terminated the day after Christmas, there were listed 223 cases of syphilis, 104 of gonorrhea, 44 of measles, 14 of pulmonary tuberculosis. Another case of typhus fever and eight new malaria cases were found in this particular week. For the week ending January 2, there was some increase in the number of diseases reported in numbers greater than 10. For the first time in years there were more cases of gonorrhea reported than there were of syphilis, there being 239 this week, followed by 196 of syphilis, 25 of mumps, 17 of chickenpox, 13 of chancroid, 11 each of scarlet fever and pulmonary tuberculosis, and 10 of influenza. Two more cases of typhus fever and one more of malaria were reported this week. The explanation for the large number of cases of gonorrhea lies in the fact that 167 of these cases were reported from army camps. For the second week of the year which closed the 9th of January,

it is to be noted that there were reported 199 cases of syphilis, 38 of gonorrhea, 26 of pulmonary tuberculosis, 17 of mumps, 15 of chickenpox, 14 of pneumonia, 12 of whooping cough, and 10 of scarlet fever. Two cases of malaria were found this week, two of typhus, and four cases of meningitis.

HEALTH OF NEW ORLEANS

The Bureau of the Census, Department of Commerce, reports that for the week ending December 12 there were only 128 deaths in the city, as contrasted with 164 for the previous week, a quite sharp drop. These figures were divided , 81 white and 47 negro, including 15 deaths of children under one year of age. There was some increase in the number of deaths in the week which closed December 19. One hundred and forty deaths this week were apportioned 85 white, 55 negro, with 20 of the deaths occurring in children under one year of age, 13 of whom were colored babies. The week which ended December 26 found a greater number of deaths arising in the city than during the previous week, 15 more, as a result of 20 more white people who died the previous week and five less negroes. There were only 14 deaths in infants in this time. The first report for 1943 was poor, the 170 deaths representing a considerable increase over any week over a long period of time, but still considerably better than the three-year average for the corresponding week which was 194. There were fewer white deaths in the city, 97 in the white population expiring, but there were more negro deaths, 73 dying this week. There were exactly the same number of infant deaths as in the previous week. The first week of the new year which officially ended January 9 showed a slight decrease in the total number of deaths in the city. Of the 161 people dying, 108 were white and only 53 in the colored population, which was considerably below the three-year average. Strange to say that there were only seven infant deaths this week, divided four white, and three "all others."

WAR PRODUCTION BOARD ORDER AFFECTS VITAMIN CAPSULES

To conserve vitamin A supplies during wartime, W.P.B. order L-40 limits the content of capsules to 5,000 vitamin A units.

In compliance with this order, capsules of Mead's Oleum Percomorphum 50% With Viosterol now contain 83 mg. of oil, equivalent to 5,000 vitamin A units and 700 vitamin D units per capsule.

The new size capsule is now supplied in boxes containing 48 and 192 capsules—about twice the number of capsules without increase in price.

A DOCTOR'S PLEA IN WARTIME

The doctor's life, in times like these,
Is not exactly one of ease.

For, on the home front, each M. D.
Is busier than any bee!

He's shouldering the burden for
The other docs, who've gone to war.

This leaves your doctor precious little
Time to sit around and whittle.

And indicates the reason why
You ought to help the poor old guy.

HOW?

1. By keeping yourselves in the best of condition
   Thus avoiding the ills that demand a physician.

2. By phoning him promptly when illness gives warning,
   But—unless very serious—waiting till morning.

3. By cheerfully taking whatever appointment
   He makes for prescribing his pills or his ointment.

4. By calling on him where he works or resides
   Instead of insisting he rush to your sides.
   (Of course, he'll come 'round when there's need for his service
   But spare him the trip when you're nothing but nervous.)

5. And, last but not least, you can help in this crisis
   By carefully following Doctor's advices.

* * *

If these commandments you'll adhere to
A doctor's heart you will be dear to!

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WOMAN'S AUXILIARY

This month we publish a letter from our State President, Mrs. Clarence B. Erickson. Let us read it carefully and resolve to give Mrs. Erickson our loyal support, so that, handicapped as she is by war conditions, the work of the Auxiliary may nevertheless go on successfully under her administration.

The letter follows:

Dear Auxiliary Members:

It is with deep regret that I feel that I cannot visit each and every auxiliary this year. Traveling conditions are such as to discourage my trying. Also I feel that it is necessary to conserve the income of the State Auxiliary as well as that of the individual chapters. There will no doubt be considerable loss of membership with resultant loss of income due to so many doctors being in service. However, I intend to keep in touch with all auxiliaries by mail although I realize that this is not as satisfactory nor pleasant as personal contact.

My message to you all large or small is to continue with the work that has been started and when possible to keep in touch with the wives of doctors in service. There are so many things you can do to bring cheer to these members. Do urge them to attend meetings and make them feel that they are still active members. In this way you are assured of an interested member when Victory is won and all return to normal life again.

The decision as to whether or not there will be a convention and the plans for it, if held, will be published in the Auxiliary News of the Journal.

To date very few contributions have been received for the Widows' Fund. As you know this is a new project, and we should exert ourselves to get it off to a good start. As time goes on this fund will be of untold benefit to many.

One of the most vital phases of Auxiliary work is our contribution to the Red Cross and all war work. If there is no Red Cross Chapter in your community try to organize one. There are so many ways in which women can help in Red Cross Work, namely; surgical dressings, home nursing, nurses aid, nutrition classes, etc. A group of auxiliary women would find any of the above not only interesting but a great help to the war effort. A report on this work will be asked for in May.

If there is any way I can be of help to you please do not hesitate to write me.

My very best wishes for the New Year and success in your Auxiliary work.

GERTRUDE CAPPER ERICKSON, Pres.

The regular monthly meeting of the Woman's Auxiliary to the Orleans Parish Medical Society was held January 13, at the Orleans Club. At this meeting the following officers for 1943 were installed:

President—Mrs. Cassius Peacock.
First Vice-President—Mrs. Theodore Simon.
Second Vice-President—Mrs. Hermann Gessner.
Third Vice-President—Mrs. Henry Blum.
Recording Secretary—Mrs. Edwin Socola.
Corresponding Secretary—Mrs. Daniel J. Murphy.
Treasurer—Mrs. Jerome Landry.
Historian—Mrs. Carroll Gelbke.
Parliamentarian—Mrs. Otto Joachim.
Publicity Secretary—Mrs. William Kohlmann.
Past-President—Mrs. Paul Lacroix.

BOOK REVIEWS

The Hand, Its Disabilities and Diseases: By Conduct W. Cutler, Jr., M. D., F. A. C. S. Philadelphia, W. B. Saunders Company, 1942. Pp. 572 illus. Price $7.50.

Most conditions and diseases affecting the hand are surgical in nature. Even many constitutional diseases, such as vascular disturbances, thromboangiitis obliterans, Raynaud's disease, are of main interest to the surgeon. A book which attempts to encompass the clinical aspect of the diseases of the hand must of necessity cover a variety of conditions.

The author of this volume was successful in condensing information mainly to the practical aspect without being too brief. The book presents a first chapter on anatomy. This is surgical anatomy and practical anatomy and is accurate and sufficiently informative for the student to answer the usually proposed questions. Following this the author considers infections, then burns, wounds, injuries, fractures, repairs of tendons and other reconstructions, tumors and finally in brief the effect certain constitutional diseases have on the hand.

Illustrations are good though not very numerous. The text is authoritative and didactic. One of the notable pleasing deficiencies is the absence of too numerous quotations and repletive bibliography.

The author tempers his consideration of surgical indication with seasoned judgment. A foreign body in the hand is not just something there to be removed by the surgeon; rarely there are reasons for leaving it alone.

This book gives the student and practitioner the accurate information he needs about the hand.

HOWARD MAHORNER, M. D.

Shock; Its Dynamics, Occurrence and Management: By Virgil H. Moon, A. B., M. Sc., M. D. Philadelphia, Lea and Febiger, 1942. Pp. 324, illus. Price $4.50.

This book is a concise, compact statement of the factual knowledge concerning the pathology of shock. This is of vital interest due to the present World War. He defines shock as a disturbance of fluid balance resulting in a peripheral circulatory deficiency which is manifested by a decreased volume of blood, reduced volume flow, hemoconcentration, and by renal functional deficiency. The book is divided into two parts. Part one is concerned with the vascular dynamics of shock, in which he considers "the physiologic and pathologic features of shock, its dynamics, its conditions of occurrence, blood chemical changes, similarities and distinctions between shock and the effects of hemorrhage, disturbances or renal function" and other characteristics are detailed. There

is a careful consideration of the present methods of interpretation of shock and experimental methods that have been employed in its production and detection. Part two is concerned with the prevention, recognition and management of shock. This section deals exclusively, as stated by the author, with the practical matters concerning these points. One chapter sets forth the most recent developments in the use of transfusion, plasma, serum, and blood substitutes in the treatment of hemorrhage and shock.

This is an excellent statement of the problem of shock and its treatment, which will be extremely useful to the student and practitioner.

LEROY J. KLEINSASSER, M. D.

Treatment in General Practice: By Harry Beckman, M. D. 4th ed. Philadelphia. W. B. Saunders Company, 1942. Pp. 1015. Price $10.00.

The excellence of the three previous editions has won for this text a well established place in the working library of the practitioners of medicine. The same general plan of arrangement has been followed in this volume. The monographs are arranged according to disease groups, such as infectious diseases, and diseases of the gastrointestinal system. In each division, they are placed alphabetically. In the text of each of these there is an outline of the history, and diagnosis, followed by a fuller discussion of therapy, prophylaxis and other related data. Many prescriptions are included, these being in English and showing both the apothecaries' and the metric weights and measures. In the latter part of the volume there are excellent chapters on poisons, burns, diseases of the skin, sulfonamide toxicity, as well as the management of various symptoms such as insomnia, and hiccough.

One of the outstanding features of all of the editions has been the large number of quotations from outstanding clinicians and, in most instances, Dr. Beckman has consistently shown excellent judgment in his selections.

This volume is not intended to replace in the physician's library, the extensive systems of medicine or even the general texts on practice, but it is nevertheless more than a ready and valuable reference for the busy doctor in meeting his daily requirements for treatment. Altogether, it is excellent and continues to fill a long felt want.

OSCAR W. BETHEA, M. D.

The National Formulary: Prepared by the Committee of National Formulary by authority of the American Pharmaceutical Association. 7th ed. Washington, American Pharmaceutical Association, 1942. Pp. 690. Price $6.00.

Many physicians do not realize the importance of this valuable work. It should be on the desk of everyone practicing medicine and it will be found of assistance in direct ratio to the frequency with which it is used.

The first edition was published in 1888 by the American Pharmaceutical Association, and it was compiled to meet the definite need of standardizing the multitude of pharmaceutical products that were on the market and not included in the Pharmacoepia. It contained monographs covering 435 such preparations.

The seventh edition has kept pace with the rapid advance in medicine and pharmacy. It includes 459 monographs on pharmaceutical preparations and 273 monographs on drugs and chemicals. As compared with the sixth edition, there are 97 additions and 51 deletions. Only a few changes have been made in the titles, 15 in the Latin and 15 in English.

This volume has the same legal status as the Pharmacoepia. The original policy of the publishers is still adhered to with regard to its relation to the Pharmacoepia. No item is included in both volumes. When for any reason a drug in the Formulary is included in the Pharmacoepia, it is dropped from the Formulary, and when a drug is deleted from the Pharmacoepia, if it is of sufficient importance it is eligible to being included in the Formulary. The busy physician will find here much valuable information about the drugs he is prescribing and many useful formulas that will assist him in getting his medicinal agents to his patients in the most efficient and acceptable form.

OSCAR W. BETHEA, M. D.

Starling's Principles of Human Physiology: Edited and revised by C. Lovatt Evans, D. Sc., F. R. C. P., F. R. S. LLD. Philadelphia, Lea and Febiger, 1941. 8th ed. Pp. 1247. Price $10.00.

Although revised and considerably enlarged, the present edition of this standard textbook continues to be written for the student of physiology rather than for the clinician. To save space, the author sets out to refer only "to such clinical matters as are of general interest to the subject, and some of the specific instances in which, as has often happened, physiological inspiration has come from clinical material." There is thus practically no mention of the pathological physiology concerned in diseases of the cardiovascular, respiratory or renal systems although lesions of the central nervous system are treated at some length in a section which has been entirely rewritten. Considerable new material has also been added to achieve unusually complete discussions on reproduction and carbohydrate metabolism.

It is surprising that in the revision of the section on special senses, Dr. Hartridge failed to add the use of pseudo-isochromatic charts for the testing for color blindness to the list of available methods.

The work of Rowntree and collaborators on the thymus is still emphasized although it has failed of substantiation by several groups of workers. On the other hand, it would seem that considerable more emphasis and space might have been given to a consideration of the effects of low oxygen tension and high altitude as related to the problems of aviation.

H. B. MAYERSON, Ph. D.

Synopsis of Ano-Rectal Diseases: By Louis V. Hirschman, M. D., F. A. C. S. St. Louis, C. V. Mosby Co., 1942. Pp. 315, Illus. pl. Price $4.50.

The condensed three hundred and fifteen pages include seventeen rather complete chapters on different aspects of ano-rectal disease, ample illustration and twelve excellent color plates.

The chapter on anatomy is found to be remarkably detailed, including the essential characteristics of the sigmoid. An excellent section is titled "Symptoms which call attention to the rectum;" herein is listed a surprisingly large group of complaints which possibly convict the rectum. Rightly he calls for more emphasis on proper endoscopic investigation of rectal bleeding. Adequate equipment is described and lauded and properly so, especially with relation to the virtues of the Hanes and Buie tables. A suction apparatus is an unmentioned essential.

In discussing anesthesia, the author has covered all but the intravenous barbiturates; perhaps purposely he avoids their use, but in many instances they are ideal for examination in the usual instances and for minor surgical procedures.

A most difficult entity, pruritus ani, occupies much space but little that is new is offered. The roentgen therapist will be disappointed at the neglect of this means of correction. The minor and major surgical procedures concerned with fissure, abscess, fistula and sinus, hemorrhoid and polyposis are instructively and thoroughly described. Such difficulties as impaction, prolapse and foreign bodies are interesting and sufficiently dwelt upon.

Unquestionably this is an excellent synopsis which accomplishes its purpose in covering the field and emphasizing the entities of importance. It is, however, regrettable that lymphopathia venereum, gonorrhea, sexual perversion, rectalgias of neuropsychiatric origin and rectal incontinence are not included to complete the thoroughness of the work and leave it without justifiable criticism.

GORDON MCHARDY, M. D.

Cabot and Adams' Physical Diagnosis: 13th ed. by F. Dennette Adams, M. D. Baltimore, The Williams and Wilkins Company, 1942. Pp. 888 with 398 illustrations. Price $5.00.

When Richard C. Cabot presented his famous "Physical Diagnosis" in 1900, it was written in the preface that "this book endeavors to present an account of the diagnostic methods and processes needed by competent practitioners of the present date." In this thirteenth edition, edited by Dr. F. Dennette Adams and a group of distinguished colleagues, exactly that has been accomplished.

It is not necessary to review this work in great detail. Thousands of practicing physicians studied earlier editions of Cabot's great work, and the thousands of medical students in clinical classes today may obtain just as much value from using this one. Above all, it is practical, logical and informative. The student learns not only how to perform a given maneuver, but, what is much more important, how much essential information it will give him about his patient. The student is cautioned against the error of basing his diagnosis on any one single finding and urged instead to correlate all his data and then to reach a conclusion. Again and again sentences in italics point out the pitfalls to be avoided and the more important bits of evidence to be obtained. Of especial interest is the frequent admonition that a patient may be sick without appearing so, and that even when physical signs are meager, there may be significant disease. Above all, the false barriers between clinical and laboratory diagnosis have been eliminated.

The familiar grouping of subjects has been maintained but modified. In some places, one searches for well-known physical signs which formerly occupied places of prominence only to learn that much more information is to be obtained from the newer (usually the chemical or the instrumental) approaches. In other places, much more attention is devoted to methods of examination which had not yet been devised when the earlier editions were written. Unquestionably, the book has "grown" with advances in diagnosis, while yet keeping its physical size within reasonable bounds.

Textbooks on physical diagnosis can never satisfy a majority of teachers because there is wide difference of opinion concerning what should be taught under the classification of physical diagnosis. Despite this objection, it is safe to state that any medical student could profit much from studying this book, and any teacher of the subject could well use it as a basis for his instruction.

SYDNEY JACOBS, M. D.

War Medicine, A Symposium: Edited by Winfield Scott Pugh, M. D. New York, Philosophical Library, 1942. Pp. 565. Price $7.50.

This is a compilation of 57 papers which originally were published in various medical journals throughout this country, in Canada and in Great Britain. These are grouped together under three general headings "Surgery," "Aviation and Naval Medicine" and "General Medicine."

Although the individual articles are somewhat related to each other, there is no continuity of subject. Each is a separate contribution having to do with some phase of the examination or treatment of men in the armed services. As would be expected, the greatest emphasis is on the effects of trauma and the treatment of traumatic injuries. Singularly enough, there was not included any contribution on epidemiology, sanitation or the control of venereal disease—topics of prime importance under the conditions of modern warfare.

This book will undoubtedly be useful to the physician newly called to any one of the armed forces.

SYDNEY JACOBS, M. D.

A Textbook of Fractures and Dislocations: By Kellogg Speed, S. B., M. D., F. A. C. S. 4th ed. rev. Philadelphia, Lea & Fibiger, 1942. Pp. 1106. Price $12.50.

This is the fourth edition of a longstanding textbook on fractures. It retains its excellence and remains among the best texts, by being brought up to date with numerous revisions. The text clearly defines the different varieties of fractures and didactically indicates the methods with which they may be successfully treated. Illustrations are numerous. They are well chosen and the quality of them is excellent.

One of the few deficiencies noted is the absence of methods of pin fixations of the Roger-Anderson type and the mechanics for distraction pin methods. The former are so popular in modern warfare, that some illustrations of them would not have been wasted space. Unfortunately, internal fixation of the femur is illustrated mostly by failures, and the Whitman method is indicated as still being of decided comparative value. Not to condone inexpertness in either method, it is probably true that expert management is just as essential for good results by use of the Whitman method, as it is with internal fixation.

HOWARD MAHORNER, M. D.

Roentgen Treatment of Diseases of the Nervous System: By Cornelius G. Dyke, M. D., F. A. C. R. and Leo M. Davidoff, M. D., F. A. C. S. Philadelphia, Lea & Febiger, 1942. Pp. 198, illus. Price $3.25.

Before 1925, the literature on roentgen therapy of tumors of the nervous system was confused because of the lack of knowledge of the true pathologic picture of these lesions. However, since that time much information regarding the classification and radiosensitivity of these lesions has been obtained. This fact added to the improvement of x-ray therapy apparatus has contributed to the splendid progress which has occurred in this field.

The authors of this volume are well known for their many excellent contributions to the subject. Besides a thorough summary of their own extensive experiences in this field, there is also included the reports of the results obtained by many outstanding radiologists interested in roentgen therapy of lesions of the nervous system. A detailed review of the English literature adds considerably to the value of this work.

This book is divided into a smaller first section concerning the effect of radiation on normal nervous tissue and a considerably larger second section dealing with the effect of radiation on pathologic processes affecting the nervous system. It contains all the recent useful information necessary for the accurate and efficient roentgen therapy of lesions of the nervous system.

J. N. ANÉ, M. D.

Advances in Pediatrics: Edited by Adolph G. De Sanctis, M. D. Associate Editors: L. Emmet Holt, M. D., A. Graeme Mitchell, M. D., Robert A. Strong, M. D., Frederick F. Tisdall, M. D. New York, Interscience Publishers, Inc., 1942. Pp. 306. Price $4.50.

The editors have compiled a collection of the most significant contributions to pediatric literature which have appeared during the past two years. Continuance of this volume as an annual review is proposed.

The book includes ten sections by various authors as follows: Toxoplasmosis, a recently recognized disease of human beings, by Albert B. Sabin; review of virus diseases, by Horace L. Hodes; chemotherapy in diseases of infancy and childhood, by Benjamin W. Carey; electroencephalography, by Major Normal Q. Brill; the role of vitamin K in hemorrhage in the newborn period, by H. G. Poncher; persistent ductus arteriosus and its surgical treatment, by Robert E. Gross; the premature infant, by Abraham Tow; tuberculosis, by Waldo E. Nelson; endocrinology, by Murray B. Gordon; short abstracts of some other advances in pediatrics, by Adolph G. De Sanctis and George E. Pittinos.

The volume will undoubtedly be of greatest value to those who find it impossible to cover the current pediatric literature as it appears. The reviewer feels that in general the various articles could be presented in a much more condensed form, particularly since the original work has been published so recently and is so readily available.

The section on toxoplasmosis by Dr. Albert B. Sabin rightly stands first in the volume as the most lucid and interesting contribution. The very short abstracts on subjects such as cystic fibrosis of the pancreas, influenzal meningitis, and the prophylactic use of sulfanilamide in rheumatic fever seem to deserve more detailed coverage than is accorded them in the final section.

"Advances in Pediatrics" should prove to be of inestimable value to the busy practitioner.

R. V. PLATOU, M. D.

The Electrocardiogram and X-ray Configuration of the Heart: By Arthur M. Master, B. S., M. D., F. A. C. P. Philadelphia, Lea & Febiger, 1942. 2nd ed. Pp. 404, illus. Price $7.50.

The second edition of this monograph has been extensively revised and amplified to add merit to an already worthwhile volume. The atlas form of presentation has been maintained. Correlation of the electrocardiographic examination with the teleoroentgenogram is shown in exceptionally good reproductions taken from cases in the author's own experience. These correlations add to the medical literature an important work covering all the usual phases of heart disease. Normal variations in the electrocardiogram and teleoroentgenogram are stressed to a much greater extent than is usually done, particularly the effects of age, habitus, body position, and respiration.

This edition, as was the first, is profitable reading for both the physician and student interested in heart disease.

W. A. SODEMAN, M. D.

PUBLICATIONS RECEIVED

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Charles C. Thomas, Springfield, Illinois: The Hospital Care of the Surgical Patient, by George Crile, Jr., M. D. and Franklin L. Shively, Jr., M. D.

The MacMillan Company, New York; Cambridge: At the University Press: Biochemistry and Morphogenesis, by Joseph Needham, F. R. S.